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Cable Address ..... Autoland, Philadelphia
Telephone ..... Sherwood 1424

OFFICES

New York—U. P. C. Bldg., 239 W. 39th St., Phone Pennsylvania 6-0080
Chicago—367 West Adams St., Phone Randolph 9448
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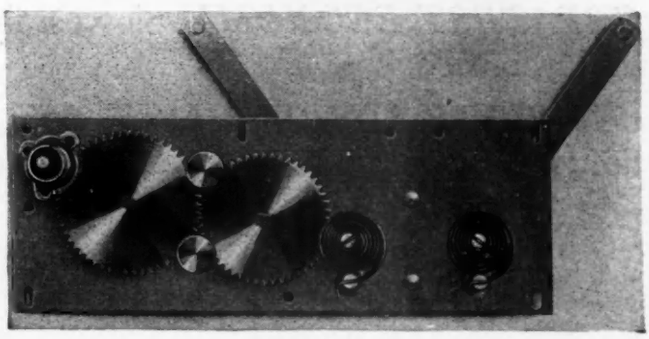

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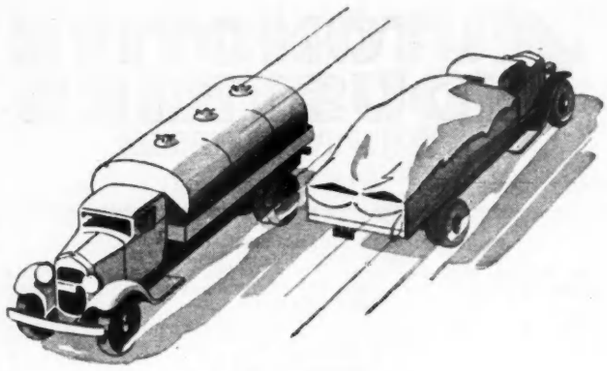

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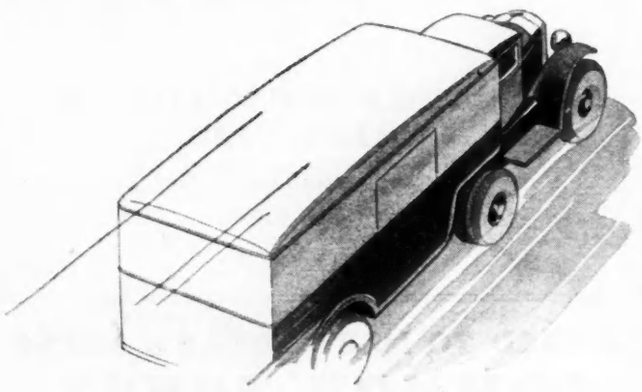

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AUTOMOTIVE INDUSTRIES

Volume 67, No. 6 • THIRTY-FOURTH YEAR • August 6, 1932

Motor Men Look Outside Own Realm for Signs of Business Betterment

Automotive industry, past its period of rapid growth and unable to lead country from this depression, jumps in with real help to others

by Norman G. Shidle

AUTOMOTIVE men are turning their eyes and their efforts as never before to betterment in general business conditions as the way out of depression for our own industry.

Because it was a leader in the return from several previous crashes, the automotive industry has been ballyhooed time and again as the business which will reflect the first dawn of the next cycle of prosperity.

Eight or ten times within the past two years, rather general newspaper publicity about "turning the corner" has avowedly been based on some meager signs of increased sales by motor manufacturers. And every time such conversation began to appear in the general press, automotive men, closely in touch with the actual situation in their own industry, have said to one another, "There's nothing in this; our business still isn't good and they seem to be basing predictions about general prosperity on the assumption that it is."

Most automotive executives have realized throughout the current unpleasantness that their industry occupied a very different relation to the general economy today than it did during previous depressions. Then, the industry was still in its period of rapid growth; now, it has taken its place with the older industries, having entered into that section of its life curve which may be called the period of stabilization. This time it has been the electric refrigeration industry which *seemed* to defy the laws of economics; to be immune to the general trend. But it really wasn't. The electric refrigeration industry made advances while other industries were receding for the same reason that the automobile business did in some previous depressions; the electric refrigeration industry has just passed its initial period of becoming a part of the economic life of the country; it is in the midst of its period of rapid growth.

But even realizing these facts, automotive men were eager to be practical. They weren't going to give up on the basis of any theories. They had led the way out

of other depressions. Maybe they could do it again. At least they were going to try, and try with a will.

So the industry poured millions of dollars into engineering and research. It developed new models of remarkable quality and astoundingly low price. Already efficient production systems were even further improved and steady sales promotion effort was maintained throughout the worst of the panic.

Finally the efforts of the industry to function once more as the Moses of the depression culminated in a concentrated advertising and sales campaign during the month of April, 1932, when more than $18,000,000 was thrown into a daring bid for supremacy over the still rising tide of adverse economic forces.

That effort failed. It didn't fail for every company, nor equally for all who participated. One or two new successes have grown from it. But it did fail as to turn the tide of business for the industry as a whole or for the country as a whole. That fact must be generally admitted today.

And so, as stated in our first paragraph, we find automotive men today bending every effort toward reconstruction of those national factors affecting every business as the best means of promoting their individual progress at the moment. The industry is no longer hopeful that it will be able to lift itself by its bootstraps, let alone lift a lot of other industries with it.

Shoulders to the Wheel

In no way is this attitude more specifically illustrated than in the recent activities of Alfred P. Sloan, president of the dominant General Motors Corp., as well as in the more intense interest in the national economy being taken by almost every automotive executive of importance. President of General Motors since 1923, Mr. Sloan has been notable for concentrating his entire time and attention on the problems of the corporation itself. While always taking a helpful and constructive attitude toward movements concerning the industry and the country as a whole, his name cropped up in the public prints less frequently than that of most men in similar high positions. He made relatively few public statements; he served on relatively few public committees or commissions. He became a director of the National Automobile Chamber of Commerce only in 1931. Now, in addition to constructive personal activity in N. A. C. C. work and personal participation in the industry's struggle against the tidal wave of taxes which Congress has rolled over the automotive business, we find Mr. Sloan participating in many activities for the general good. He is chairman of the newly formed Highway Users Conference, established to encourage the development of equitable bases of taxation for use of the public highways and the prevention of the imposition of undue burdens on highway traffic. He is heading a subcommittee of bankers and industrialists, headed by his old college mate, Owen D. Young, which, through the National Industrial Conference Board, is trying to find "methods of making the large funds now being released by the Federal Reserve banks useful affirmatively in developing business."

And Mr. Sloan's activity in these matters is merely typical of the greater interest which all automotive executives are taking today in general, national efforts to turn the tide of depression, and the tendency of these executives to look to a general business upturn as the basis for renewed automotive prosperity. We find Harvey Firestone, for example, saying, "Political uncertainty is now the chief deterrent to better trade conditions in this country," and adding his belief that in 1933 the automobile industry will have a turn for the better along with all other industries.

While still intent on keeping their own castles in fighting trim, we find automotive men today listing the items necessary to recovery something like this:

1. Cut governmental expenditures and reduce tax burdens. Our industry must bear 25 per cent of the total tax budget next year. Only by reduction of the budget can we hope to get our specific taxes reduced.

2. Find means of getting into affirmative use the credit funds now available through the Federal Reserve banks.

3. Work for stabilization of commodity prices and try in every way possible to increase public confidence in the possibility of trade revival.

The tax discussion is a continuing one and has been widely analyzed. The latest developments were discussed in our July 16 issue in an article titled "New Tax Barrage Looms When 1933 Solons Meet."

Of even more immediate importance is the task of actually putting to work the credit facilities now theoretically existing. Despite increased credit made available by the government, bank loans have continued to decrease, although loans to banks have been more numerous. The new Sloan subcommittee is attacking this problem first by means of a questionnaire to many large and small corporations in the New York district asking a report on their experience in obtaining adequate credit supplies. The inquiry is directed particularly at small business concerns, for it is felt that that the large companies have all the cash they need or are in a position to procure sufficient credit.

"Business concerns are requested," according to the *New York Tribune*, "to state whether they have had any difficulty in obtaining from banks the credit accommodation required for legitimate business purposes. If the accommodation was refused, information is sought as to the name of the bank which turned down the application, the grounds for the refusal and the amount of credit applied for. Suggestions are sought from various corporation heads as to ways and means of making credit flow more freely in order that employment may increase."

A similar survey has already been completed of the Cleveland Federal Reserve District. The Cleveland committee said that "recovery was dependent more upon the sympathetic and helpful approach of the banker to the credit problem of the small manufacturer than it was upon any other single factor."

The Credit Situation Needs Stimulating

The need for these further forceful investigations of this particular subject is indicated by the failure of several previous surveys to provide any clear-cut answer to the questions involved. An effort of the Associated Business Papers, Inc., to get a large number of banks to indicate whether business is applying for loans or not drew partial replies from six, courteous refusals to answer from three and no answers whatever from fifteen. Survey of the situation by the editors of the business publications associated with this group showed definite complaints from a number of industries, although in a number of instances no direct evidence developed that banks were refusing good loans.

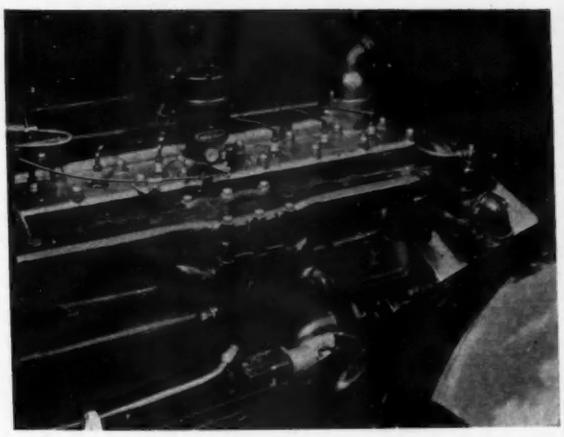
A survey by the *American Bankers Association Journal* purported to show by detailing a number of specific instances how "bank leadership is getting better profits for their customers."

(Turn to page 192, please)

Reo's First Eight Truck is Announced

New engine of 358 cu. in. develops 110 hp. at 2800 r.p.m.

Six, listing at $1,095, is added to Lansing Company's Truck Line



View of the installed eight-cylinder engine showing the oil temperature regulator at the front of the block and the Electro-Vac governor just above the carburetor

A NEW six-cylinder 2-ton truck listing at $1,095, and a new eight-cylinder 4-tonner at $2,995 are announced this month by the Reo Motor Car Co. Under Reo's new rating system announced last month these trucks are represented by the designations of 11,000-4¼-47 for the 2-ton, and 20,000-3¼-43 for the 4-tonner, the first figure indicating the gross rating, the second figure being the grade in per cent that the truck can climb in high gear fully loaded with the standard gear ratio, and the third being the miles per hour at governed speed.

Details of the new trucks are probably best told by the accompanying specifications, together with the above rating which tells the performance story. Photographs give an idea of the appearance, the 2-tonner resembling in general lines the new 1½-ton model announced last month.

Particularly interesting is Reo's entry into the eight-cylinder truck field. This straight-eight engine is remarkably clean in appearance, and particularly noticeable is the fine work on installation in the chassis that has been worked out both for service and for neatness.

There are also two new devices on this 4-ton model of unusual interest, an oil temperature regulator and a new type of governor for which the claim is made that it eliminates "lurching" of the truck when the governor cuts in or out.

The oil cooler is located ahead of the engine and consists of a core through which cooling water passes on its way from radiator to cylinder block. Around and through this core flows the oil. A reduction of 52 deg. in oil temperature is claimed for this cooler, while in the winter time it should be of help in raising the temperature of the oil more rapidly.

The Electro-Vac governor on the 4-tonner derives its name from the fact that the intake manifold vacuum is used to close the butterfly or throttle valve but that the actual control of functioning is electrical. There is a little centrifugal unit mounted on the distributor shaft below the rotor. When the "governed" speed is reached for which the unit is adjusted, an electrical contact is closed causing current from the battery to flow through an electromagnet located in the governor housing. The magnet opens a by-pass allowing the manifold vacuum to operate on a piston in the governor casing, thereby closing the throttle valve.

It will be noted that the throttle-valve stands wide open until the governor cuts in. A drop in speed of ½ m.p.h. is claimed to result in opening the throttle-valve fully again.

Interesting on both the new trucks is the frame design in which great depth is replaced by extra heavy stock thickness and unusually wide flanges. Frames are cold-riveted throughout. Full-floating axles, helper springs on both models, four-speed special truck transmissions and Myers magazine type oilers for chassis lubrication are further indications of the value offered in these new models. The Myers magazine oiler, it will be remembered, incorporates a reservoir at each lubrication point, which is filled with oil and lubricates the bearings, such as shackles with a steady drip feed.

There is also a special edition of the 4-ton truck, which has a five-speed transmission, a double-reduction axle with three optional ratios, full air brakes and

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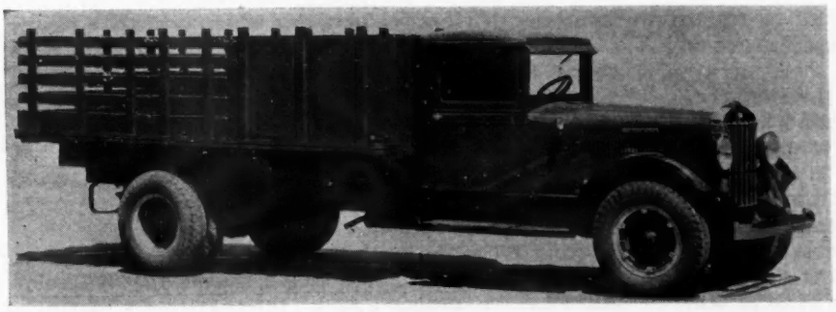
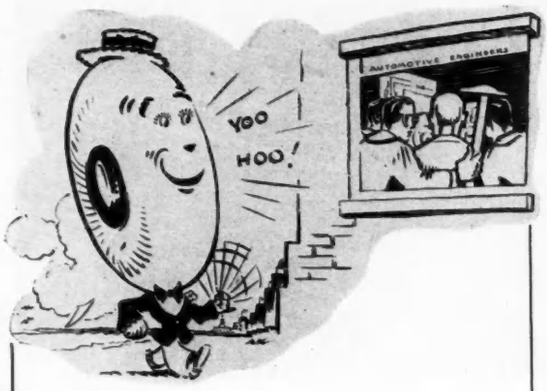


Reo's new eight-cylinder 4-tonner carries four-speed transmission and full-floating spiral bevel gear rear axle and vacuum-operated hydraulic brakes. A special edition of the model embodies five-speed transmission, double reduction rear axle and air brakes



What, No Springs?

Elimination of springs would end tramp and shimmy, although other troubles would be in the offing.

Necessity for smooth roads for such a car would reduce marketability and would defeat chance of large-production program.

Low-Pressures

This, the fourth of a series of articles on the new super-balloon tire, speculates on some radical design possibilities. Others in this series appeared in Automotive Industries on July 9, July 16 and July 23.

by P. M. Heldt

IN discussions of the possible future of low-pressure tires, the hope has been expressed that they may make it possible to do away with chassis springs altogether, thus making it possible to lower the cost of low-priced automobiles materially and incidentally eliminating the operation and service troubles to which steel springs give rise.

That it is possible to build and operate vehicles in which the frame and body rest directly on the axles or in which the axles form part of the frame there is no doubt. The question is how they compare in riding quality with ordinary low-priced cars and whether the gain in simplicity would be worth the loss in riding quality which the eliminating of chassis springs would undoubtedly entail.

Riding quality is a direct function of the frequency of vibration of that end of the chassis near which the seats are located. A high rate of vibration, of the order of 100 complete cycles per minute, gives a hard, choppy ride, while a rate of 75 cycles per minute gives a soft, smooth ride. With the latter rate of vibration the body of the passenger seems to be able to follow the motions of the car body without being subjected to unpleasant accelerating forces, and the general sensation is that of a soft swinging motion. Something of the opposite effect is obtained when riding a motorcycle or bicycle, when any road unevennesses make themselves felt as short, snappy impulses.

The frequency of vibration resulting from any system of suspension is dependent upon the deflection of the suspension member under the static load. For instance, if the deflection of the rear springs under the static load on them is 6 in., the rate of vibration of the rear end of the car will be in the neighborhood of 75 cycles per minute, and this makes a very soft suspension.

10 in. is Present Limit

Now, 10-in. is about the largest size tire that could possibly be fitted to a passenger-car wheel, unless the diameters of these wheels were increased above the present standard, which would be a reversal of practice, since wheel diameters have been coming down for a long time. It is customary to figure with a deflection of tires under static load of about 17.5 per cent their diameter, which for a 10-in. tire gives 1.75 in. deflection. If larger proportional deflections are allowed them the life of the tire is adversely affected. The frequency of vibration produced when such a tire passes over an obstacle is 142 cycles per minute, which is nearly twice that of the spring suspension having a deflection of 6 in. under static load, and the effect is very different. The actual effect on the occupants, of course, is modified considerably by the upholstery, but deep, luxurious upholstery is expensive and would hardly be used in a car designed without chassis springs for the sake of economy.

Aside from the cushioning effect of the tires, the problem of the damping action has come up. We know that when we suspend a car on soft, flexible leaf springs,

Springless Car is Possible, But Practicable on Good Roads Only

we must provide it with spring dampers or shock absorbers, or else we will have a very unpleasant rebound after the springs have been compressed by the wheels passing over an obstacle.

If the so-called air wheels consisted of perfectly elastic, thin-walled tubes, there no doubt would be a long-continued series of vibrations after the wheel had passed over an obstacle, because air is nearly perfectly elastic. However, the walls of these tires consist of four or six plies of cord, and when the deflection of the tire changes there is a bending of the side walls of the tire which absorbs considerable energy. Thus the energy stored in the tire by an abnormal compression due to a severe shock will be quickly dissipated. The suspension would not be soft and luxurious, but this would be due to the high rate of the cushion and not to insufficient damping.

One Way to End Shimmy

If no chassis springs were used, the troubles due to tramp and shimmy would be eliminated completely. Both of these phenomena are interdependent. Tramp consists essentially of an oscillation of the front-axle-and-wheel assembly around a central fore-and-aft axis between double cushions—the chassis springs and the tires. This oscillation in a vertical plane, because it involves the rapidly rotating wheels acting as gyroscopes, naturally results in a flapping of the wheels around the knuckle pivots, in accordance with the law of the gyroscope that when the axis is moved in one plane, a force tending to displace it in a plane at right angles thereto is produced.

If there are no chassis springs the front axle is no longer held between two cushions. A construction is conceivable in which there would be no separate front axle at all, the function of this part being performed by a frame cross-member suitably extended at the ends. However, this probably would result in excessive stresses on the frame, for if the car stood on uneven ground, all of the weight at the front end, for instance, might be supported on one wheel, and the loads and stresses would be further added to by road shocks sustained by one wheel. For a more nearly even division of the load, the front axle probably would have to be pivoted to the center of the frame, as in farm tractors, for instance.

Rough Going is Problem

There is no doubt that a vehicle could be built without chassis springs which when equipped with low-pressure tires could give satisfactory service on modern concrete-paved roads. But when the problem is analyzed from the economic standpoint, the prospects are not very bright. A vehicle of this type would receive consideration only in the low-priced field. In this field large-scale production is essential, as without it a low price is impossible. But large-scale production implies a wide market, and, therefore, the possibility of satisfactory use on practically all kinds of roads. This condition the "springless" motor vehicle does not meet, and the writer therefore does not expect to see it figure in the programs of the makers of "quantity-production" cars within the next few years at least.

If anyone should be curious with respect to the exact riding qualities of a vehicle fitted with low-pressure tires and without chassis springs, it would not be at all difficult to satisfy his curiosity. All that would be necessary would be to take a stock passenger car which has had its tire equipment changed to the low-pressure type, and to block up the springs and tie the axles to the chassis by means of straps, so there could be no relative motion between axles and frame. A ride in such a car should be particularly illuminating, as it would be possible to follow it immediately by a ride in the same car in its normal condition over the same road.

New Type of Transport to Feed British Railways

A NEW mechanical transport 15-ton unit, which has been designed by the Overseas Mechanical Transport Directing Committee, London, is being shown publicly for the first time at the Aldershot Tattoo.

The object of this vehicle is to provide mechanical transport suitable for Empire areas which are not now served by railways, and where development is being held up by lack of adequate transport. This vehicle is intended to be used as a feeder to railways where the sparsity of the population does not justify the heavy expenditures required to build branch lines.

The committee, which has designed this vehicle, was appointed at the end of 1928, and the funds used in the design and development of this carrier were pro-

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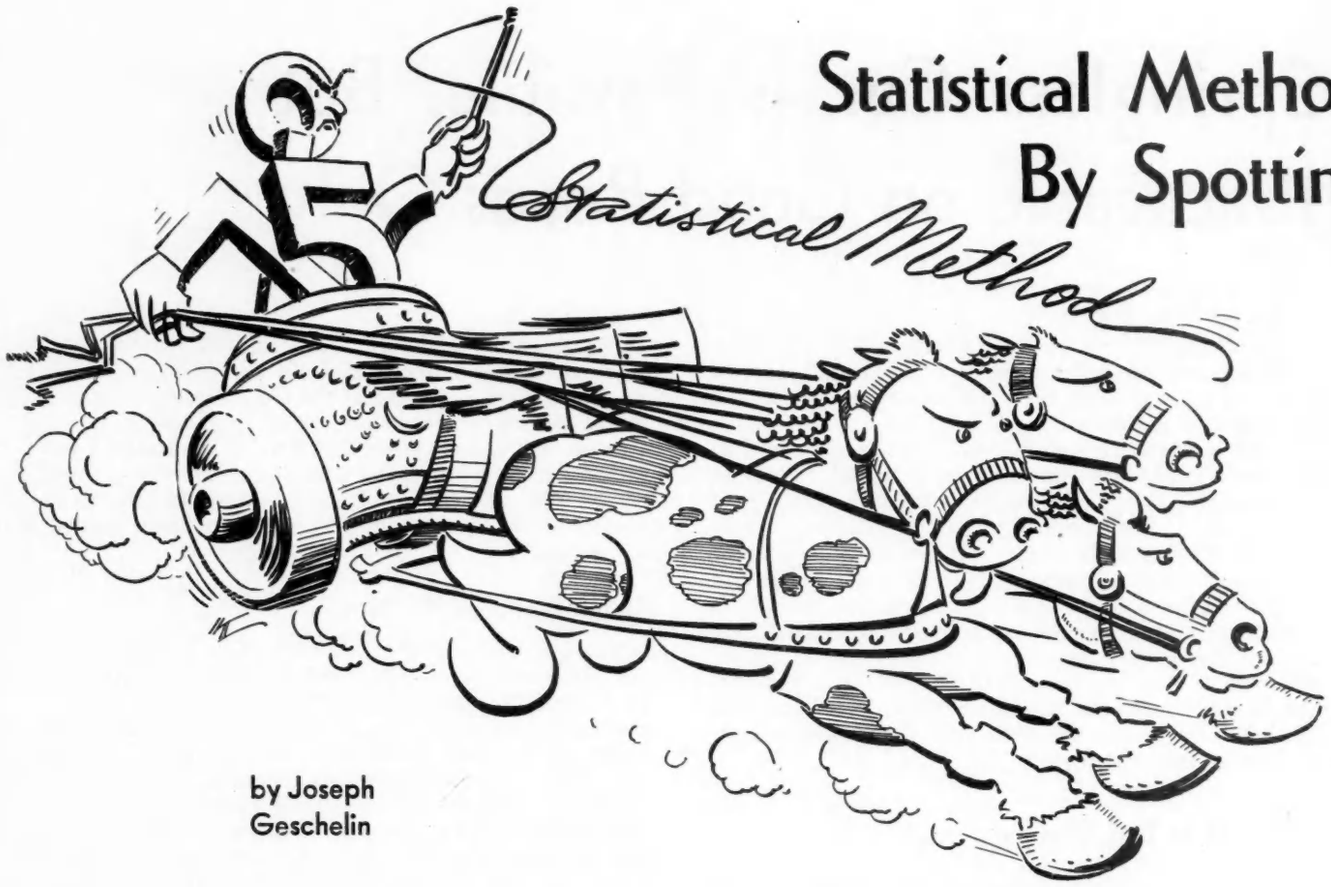
Statistical Method By Spotting



by Joseph Geschelin

NO matter how attractively a new method or a new tool may be painted the seasoned engineer and production man has "got to be shown" before he makes it a part of his everyday life. This is particularly true if the thing is tinged with scientific induction or pure mathematical theory, which may explain why the modern statistical theory still is a comparative stranger when it comes to any wide industrial application.

Yet the modern statistical theory has demonstrated its usefulness in a variety of fields. And those pioneering souls, who have mastered it and applied it to their own problems, praise it to the skies.

What is it?

Stripped of technicalities we may define modern statistical theory as a commonsense method of achieving control within defined limits of the attributes or specifications of similar things.

In research work and in production there are many problems of interchangeability, of meeting specifications in quality or dimensions, or physical characteristics within given limits. Given a mass of data on the variations in quality of a large group of screw machine parts, or say observations, of the Brinell hardness of cylinder block castings, can we say within reasonable limits how much of the variations may be attributed to chance and how much to uncontrolled variables?

The method of analysis and the philosophy back of the statistical theory aim to provide the answer. When properly used it will help one to seek out and isolate the uncontrolled factors out of the mass of variables.

When properly applied to a specific problem, it should eventually produce a controllable situation subject only to those variations which may be attributable to chance.

To the hard-boiled engineer or production man "from Missouri" we might point out that the statistical method has been exposed to the acid test in scientific problems, applied engineering, and quality control.

Perhaps the outstanding example of the latter is the inspection procedure which has stood the test of time at Western Electric Mfg. Co., whose double sampling method of inspection based upon modern statistical theory was described in *Automotive Industries* about a year ago.[1]

Consider a familiar example. Of all things in this life subject to the whims of the Fates, none seems less controllable and unpredictable than the life span of the individual. For, in addition to the physiological limitations, we are beset on every side with hazards and perils.

Yet when statistics are taken on people in groups we find there is some indication of a controlled condition. We find that this hidden host of causes produces death at an average rate which does not differ much over long periods of time. And we are led to believe that we approach what is customarily termed a "law of mortality."

We assume the existence of a kind of statistical equilibrium which enables us to assume that the probability of dying within the given age limit under the assumed conditions is a constant reality.

Does it seem fantastic to predict the life span of an individual? As a matter of fact that is the tangible basis upon which the present day gigantic insurance enterprises are founded. According to *The Spectator*

[1] Sampling Inspection Maintains Economic Levels of Quality at the Western Electric Plant, by Joseph Geschelin. *Automotive Industries*, March 21, 1931.

Points to Process Control Variables in Manufacture

Modern theory shows engineer what are good data and what observations should be rejected, thus assuring control of variables within reasonable limits

the amount of life insurance in force in the United States in 1931 was $115,500,000,000. Yet all this huge volume is written upon a "law of mortality" stated as a definite mathematical equation, and which has met the test of actual experience values.

Two typical research problems beautifully illustrating the possibilities of the statistical method were reported at the recent annual meeting of the A.S.T.M. In the first of these, Passano[2] undertook to get good controlled data from corrosion tests and to reach some definite conclusions. His paper may be summarized as follows:

"In this study, it was found that there are seven essential external factors: temperature, oxygen concentration, velocity, type of water, area of specimen, surface condition of specimen, and time of test. With these held at definite values using well water from the Miami Valley, it was demonstrated that the resulting data did not vary significantly in a series of tests.

"It was necessary to use modern statistical theory to show these things. When the essential conditions had been established, the time of test was purposely varied while the other factors were maintained, and it was found that the average loss of weight was apparently proportional to the logarithm of time over the interval investigated."

During the course of his test work there was evidence that something showed definite lack of control. It was suspected that surface condition was the source of variation and the conclusion was reached that any method of preparing the surface for test which would permit the piece to corrode all over should eliminate the variable.

When it was possible to produce specimens which corroded all over, the data pictured in Fig. 1 were obtained. Incidentally, this illustration is a good example of the statistical control chart which will be discussed more fully elsewhere in this article.

In the second paper, Skinker[3] investigated the effectiveness of the present specifications for varnished cambric tape. "Statistical analyses were made on the results of specification tests of varnished cambric from three manufacturers. Many shipments were found to have excessive variation. This variation may be due to the method of manufacture or to the method of sampling. As a result of the excessive variation, the user is unable to determine from samples the quality of the shipment of tape."

Fig. 2 shows a series of control charts taken from Skinker's paper illustrating the extreme variability in specified quality and the wide range in the quality of the product supplied by different manufacturers.

Both authors are keen students of modern statistical theory, very much alive to its possibilities in their own work. And they have followed along the lines set down by Dr. W. A. Shewhart[4] and his associates.

At this point let us shift from the engineering applications to the quality control of manufactured products. We mentioned earlier the elaborate and highly formal sampling inspection control which has been used with such signal success at Western Electric. But fortunately a very simple device may be used to solve many problems of control in automotive plants. This may be accomplished by the use of control charts built up chronologically so as to provide a permanent and active record of accomplishment.

Record of Small Stampings

Let's see how this can be done. For illustration consider some usually well controlled processes such as small stampings, well tooled operations on turret lathes,

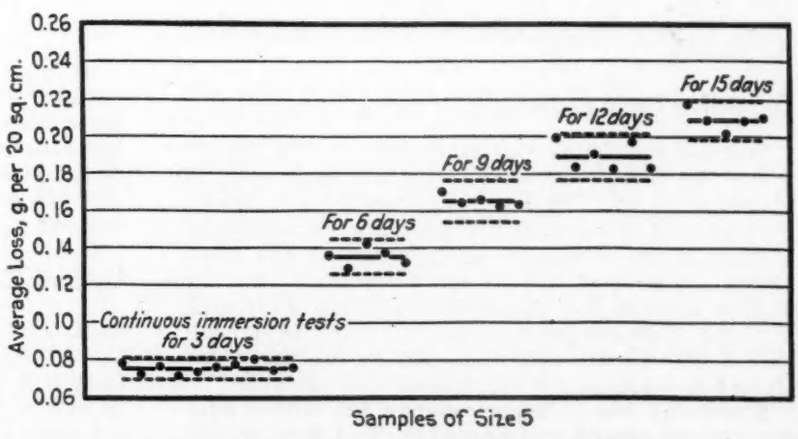


Fig. 1—Passano demonstrates controlled test conditions in corrosion tests at the American Rolling Mills

[2] Controlled Data from an Immersion Test, by R. F. Passano. Paper read at the 35th annual meeting of the A.S.T.M.

[3] Application of Control Analysis to the Quality of Varnished Cambric Tape, by M. F. Skinker. Paper read at the 35th annual meeting of the A.S.T.M.

[4] For a complete text on the philosophy and mathematical foundation for the modern statistical theory, the reader is referred to Dr. Shewhart's recent book, "Economic Control of Quality of Manufactured Product," pub. by D. Van Nostrand Co. (1931).

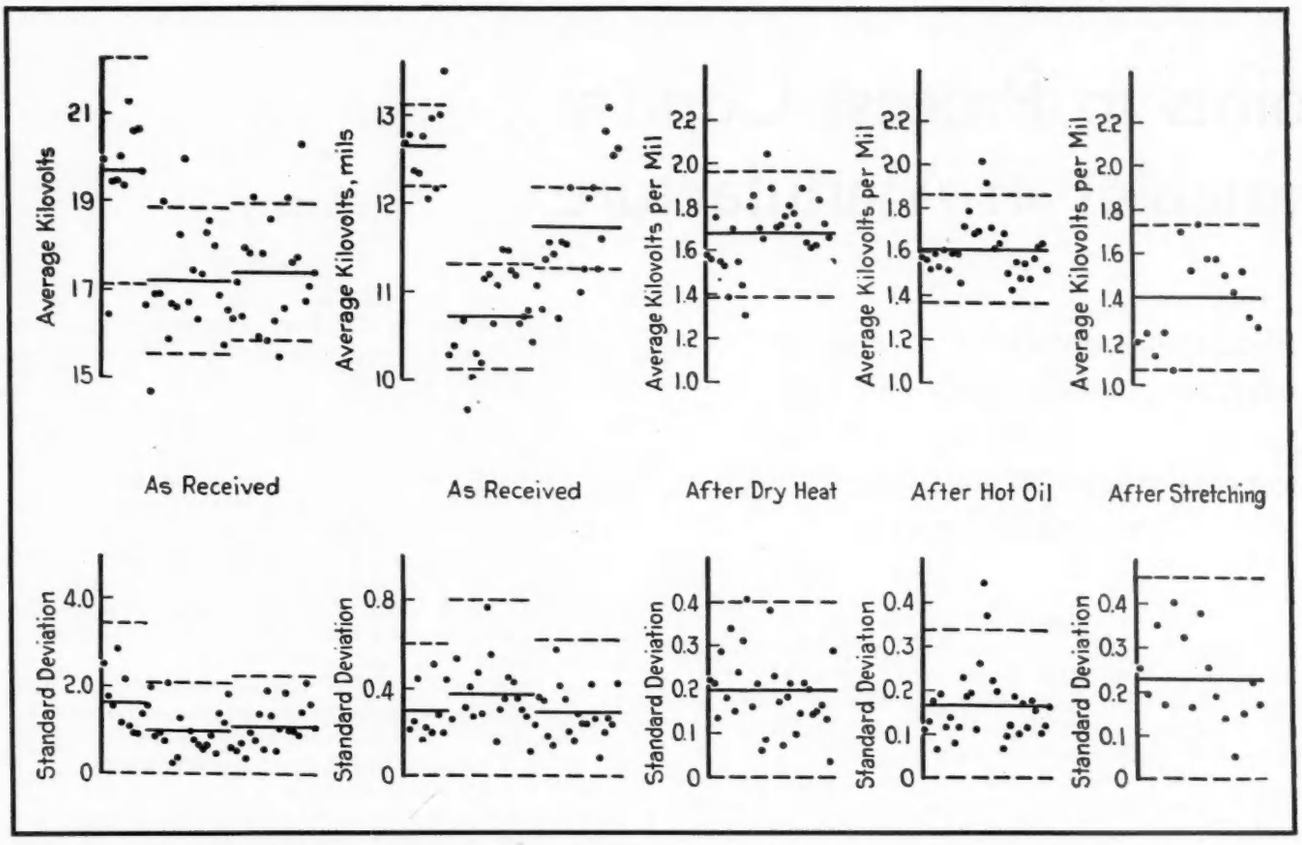


Fig. 2—Skinker shows by means of control charts that uncontrollable variations exist in varnished cambric tape

milling machines or screw machines, or such special attributes as the noise characteristics of a gearset.

Now suppose we begin to build up a careful record of the results obtained by inspecting each manufactured lot over a long period of time. In this record we would note the number of pieces in each lot and the percentage defective in each lot. Naturally what we are interested in is the general run of the percentage defects.

Consequently if we take the arithmetic average of the percentage defectives in each lot over a given period of time, we shall arrive at a single average value which may be labeled "process average." Naturally we shall expect to find variations from this average. The question is how much is permissible and acceptable, how much indicates lack of control. Statistical theory gives the answer.

Defective Parts Shown

Suppose we picture this information as in Fig. 3, where the actual percentage defective each week is plotted as shown. The heavy, horizontal lines, labeled p', represent the process average, i.e., the arithmetic average of the percentage defective during any given period. Note that due to controlled conditions the process average has decreased materially beginning with the twentieth week. This is frequently accomplished without any additional cost by the simple expedient of weeding out the uncontrolled variables.

Examining Fig. 3 again, observe the dotted lines symmetrical about the process average. These are the "limit lines" representing the permissible or allowable variations from the average. Based on long experience on the host of applications, Shewhart and his associates have found that the best value for the limit lines is proportional to three times the standard deviation. According to the modern statistical theory, limit lines thus established will provide a band comprehending variations which may be attributed to chance.

For any given set of data we may establish the limit line about the process average in the following fashion. Let p' equal the process average expressed as a decimal, then the standard deviation

$$\sigma_{p'} = \sqrt{\frac{p'\,(1-p')}{n}}$$

The upper and lower limits are given by the equations:

$$\text{Upper limit } p_L = p' + t\sigma_{p'}$$
$$\text{Lower limit } p_L = p' - t\sigma_{p'}$$

where t is a constant determined by the value of probability chosen for the limits. If we assume that the distribution of values is according to normal law probabilities, then the value of t is 2 for a probability of 0.955, and d 3 for a probability of 0.997. Also, n is the size of the sample.

Lack of Control Shown

Now let us examine the real significance of the real limit lines thus established. Wherever observations lie outside the limit lines, it may be taken as evidence of lack of control of some variable or combination of variables. In the factory this should be the signal for a thorough investigation by the factory engineering or standards department. Quite frequently unsuspected

causes of variation are discovered and remedied without increasing cost in any way. Generally the net effect of this is to improve the process average, thus producing better economy.

Needless to say the establishment of the limit lines as well as the process average must be undertaken with considerable judgment since it is essential to maintain a proper balance between quality and considerations of maximum economy.

Perhaps the following experience will serve to demonstrate the real need for some form of process control chart. Some time ago when we first began to get steamed up about this matter of statistical control, we called on a number of large automotive parts manufacturers with the intention of getting production records from which sample control charts could be plotted. The results were quite startling.

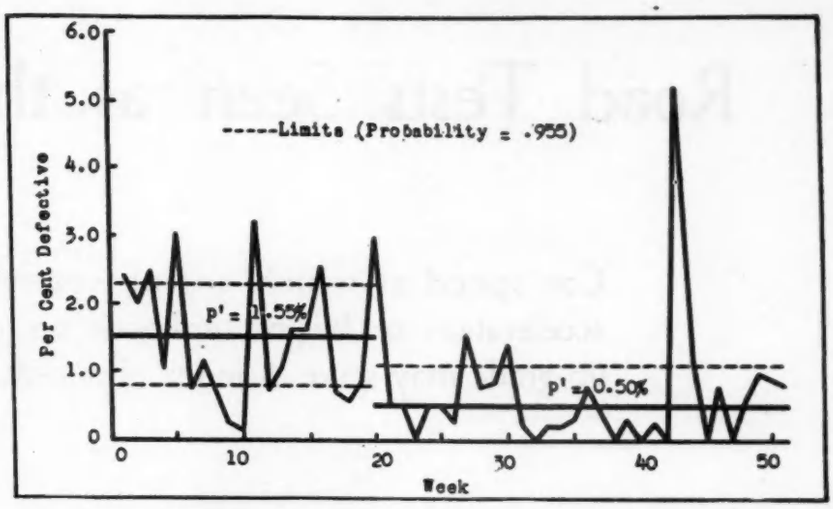


Fig. 3—Typical control chart based on process inspection of a telephone part. From the work of H. F. Dodge of the Bell Telephone laboratory

In the first place, even the well-managed plants which ordinarily have all kinds of records found that they had no record of the percentage defective by lots. Some information was available, of course, but it was woefully inadequate and could not be used to indicate past experience. The tragic thing about it all is that the executives in these several plants had assured the writer that they had specific data on their quality control and knew exactly the range in process average.

In several instances, further investigation revealed that the process average was considerably higher than they had estimated, in fact much higher than permissible. This led to a private investigation which created a little fireworks around the shop.

Thus we come to several important by-products of the philosophy behind the process control chart. Easily the most important is that of setting up adequate records designed to yield specific information. Only such records will tell the production executive exactly how the quality runs in his plant. Another is the setting up of machinery for investigating various operations, isolating usually uncontrolled variables, and pointing toward controlled processes.

It is only fair to point out that in a number of cases we found that quality was well controlled and the process average unusually low. But here it would be well worth while investigating whether or not it is economical to maintain so high a degree of accuracy. It might be cheaper in the long run to permit a somewhat higher process average. However, no matter how it works out, adequate records are essential because they will show at a glance the course of the quality level.

In retrospect we may say that many practical applications have demonstrated the value of control charts and the general tangible advantages to be derived from the utilization of modern statistical theory. Certainly it is a tool that the engineer in any field cannot afford to overlook.

Modern statistical theory provides the engineer with a philosophy and a method. It indicates what are good data, how to present them, and how to reject discordant observations. But best of all it enables one to judge by a scientific method whether or not certain variations should be left to chance. It enables one to say with more assurance that the variables involved in his investigation are controlled within desirable limits.

Aircraft Engine Mechanic's Manual

Aircraft Engine Mechanics Manual, by C. John Moors. Published by the Ronald Press Company, New York.

THIS book, as the title indicates, is intended as a text for student aircraft pilots and engine mechanics. It is divided into six parts and each part in turn comprises an average of about six chapters. The first part, entitled Elements of Mechanics, relates to the materials of construction employed in aircraft manufacture, their properties, and the hand tools used in metal work. The second part, Aircraft Engine Construction and Repair Principles, is a brief elementary treatise on the principles of the internal combustion engine. Of its six chapters the last one relates to repairs. Part III deals with Carburetors, Superchargers, Fuels and Lubricants; Part IV with Engine Ignition and Electrical Equipment; Part V with Aircraft Engine Operation and Maintenance, and Part VI with Construction, Repair and Maintenance of Specific Aircraft Engines.

Considerable sections of the book deal with specific engines and engine accessories and are based directly on publications issued by the manufacturers. The general style of the book is brief and clear, but in the general or theoretical sections the degree of accuracy is not always all that might be desired. Thus in the first chapter, following a correct definition of the term "tensile strength," the following example is given: A bar of wrought iron with 1 sq. in. cross-sectional area which will support a maximum of 50,000 lb. in tension without deformation has a tensile strength of 50,000 lb. It may be said that even a load of 1 lb. will deform such a bar elastically, and if the author means permanent deformation, then the 50,000 lb. is the elastic limit and not the tensile strength.

In spite of these defects, which are for the most part confined to the more theoretical portions, the book contains much useful information and will no doubt serve its purpose.

Road Tests Seen as the Next Step in

Car speed at which engine ceases to knock on acceleration or begins to knock on deceleration on up-grade may serve as index of anti-detonating quality

by P. M. Heldt

NOW that the Cooperative Fuel Research Committee has adopted a scale for the anti-detonating qualities of motor fuels and has evolved a procedure for the determination of these qualities, the next step in its work is the development of a method of testing fuels for anti-knock qualities on the road. Tests of this sort have been made recently by various parties, by different methods, and some of these tests have shown that under certain conditions at least the road or track tests do not range different fuels in the same order of anti-knock value as does the C.F.R. standardized procedure.

Knock ratings are a highly important factor in the marketing of fuels, and it cannot be denied that what counts most in this respect is the relative freedom from any tendency to produce, under service conditions, a knock that is offensive to the operator. If the C.F.R. test procedure does not give a fairly accurate measure of this quality, it is desirable that it should be modified, or else supplemented by road tests that give directly an index of the anti-detonating quality under service conditions.

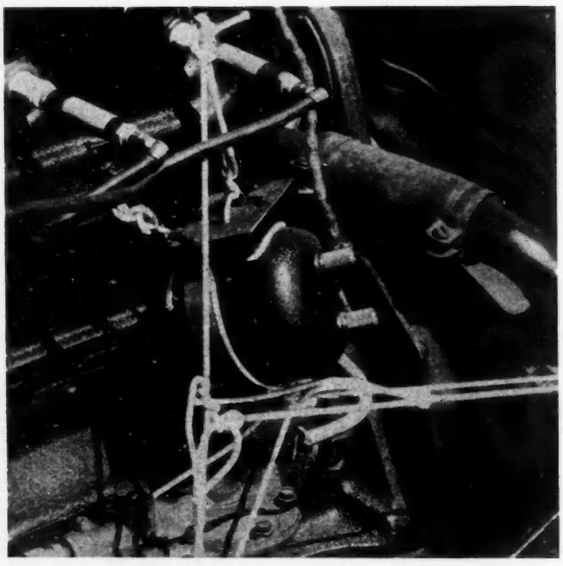


Fig. 1—Showing pick-up device attached to engine

As pointed out there are various ways of testing fuels for anti-knock quality on the road. Detonation is usually most severe when an engine is being rapidly accelerated, and the average city driver probably notices it most frequently when trying to get away quickly after a stop at a traffic light. It is, of course, a well-known fact that knocking depends not only on the fuel but also on the design and the operating conditions of the engine, the three most important factors from this point of view being the compression pressure, the combustion-chamber form, and the general temperature level as determined by jacket cooling, temperature of air under the hood, location of the exhaust manifold, and supply of exhaust heat to the incoming charge. That combustion-chamber form and operating conditions have an influence is recognized in the procedure for octane number tests by specifying that all tests must be made on a test engine of specified design, known as the C.F.R. engine, and that the temperature of the cooling liquid must be held between 205 and 215 deg. Fahr. Among other unsolved problems of fuel characteristics one that calls for an early solution is that of the committee to determine the average deviation from the results obtained with the C.F.R. engine when tests are made in stock engines on the road.

One way of comparing fuels with respect to their anti-knock qualities in road vehicles is to accelerate or decelerate cars through a considerable range of speed and to note the speeds at which knocking begins or stops. For instance, if a car is accelerated from a low speed in high gear, it is likely to knock audibly from the beginning, and as the speed increases, over a certain range at least, the intensity of the knock decreases, and finally knocking disappears altogether. The speed at which this occurs is noted. The lower this speed, the better the fuel.

Of course, with engines operating at fairly low compressions, it is impossible to produce a knock in this way with fuels of high octane number. It seems to be the consensus of opinion that tests should be made with the regular factory adjustment of the engines—not with reduced compression-chamber volume—and to cover the entire octane number range of commercial fuels, tests must be made with a number of engines of different compression ratios, or, more generally, of different knocking proclivities.

A somewhat similar method consists in driving a car in high gear up a hill, starting at a considerable speed, so that the speed will gradually decrease, and

Anti-Detonating Qualities Study

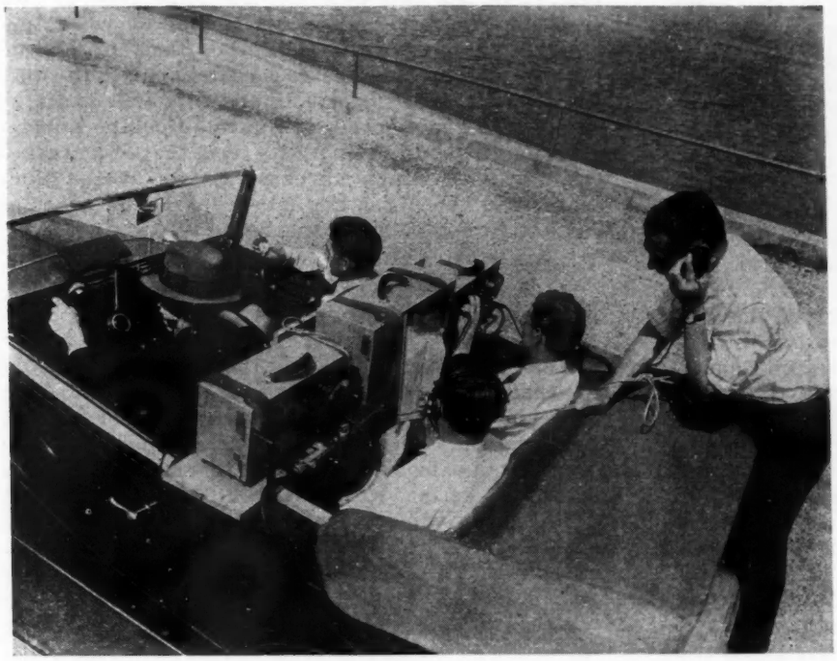


Fig. 2—Chevrolet equipped with audiometer for knock-tests

noting the speed at which the knocking begins.

In accelerating a car from a low speed it is sometimes found that there is no knock when acceleration first begins; at a certain speed a knock becomes audible, and it increases with the speed until it attains a maximum, and then decreases and finally disappears altogether. In that case, to get a complete picture of the situation, it is necessary to note both the speed at which the knock starts and the speed at which it ceases. The same holds good in the case of knock-on-deceleration tests.

One Objection

One objection that has been raised to this method —which, by the way, has been used by the Ethyl Gasoline Corp.'s Laboratory during the past year in several series of tests on various engines—is that the incipient knock or the disappearing knock which serves to determine the test result is so faint that only the trained expert can detect it, and the question has been raised whether it would not be more practical to base the results on knocks which are not only perceptible but actually objectionable to the average driver.

If observations are to be made when there is a really audible knock, then the only method available consists in measuring the intensity of the knock, and comparing intensities or reproducing them with those from mixtures of reference fuels. Considerable work has been done in recent years on apparatus for measuring the intensity of sounds, by the Bell Telephone Laboratories, which have evolved an equipment, known as an audiometer, that measures the intensity of sound in units called decibels. The decibel is a purely arbitrary unit of sound measurement, just as a degree is the unit of heat.

Engineers of Electrical Research Products (a Western-Electric subsidiary) recently conducted some road tests on the anti-knock qualities of motor fuels in collaboration with engineers of the Tidewater Oil Company on Beacon Hill near Port Washington, L. I., N. Y.

A 1931 Model Chevrolet, which had seen 3500 miles of owner's use, was equipped with an audiometer, and samples of 17 different brands of gasoline were provided. During a series of tests the specially equipped car (Fig. 2) was driven seventy-five times up an 8 per cent grade, using the various fuels.

The audiometer, which was mounted in the rear passenger compartment of the car, comprises a sound pick-up device to convert acoustic into electrical energy, a vacuum-tube amplifier, and a calibrated gain control to measure sound levels over a range of one hundred million to one. The sound pick-up device under the hood is shown in Fig. 1.

Using the Audiometer

The gasoline tank, gasoline lines, and the filter bowl of the car were completely drained of gasoline, following which a sample of gasoline from a sealed container was placed in the tank. The engine was then started and operated sufficiently long to consume all gasoline remaining in the carburetor bowl from the previous sample and, in addition, to raise the engine temperature to a constant value representative of average engine temperatures under the prevailing weather conditions. The car was then driven on the level grade toward the hill at a constant speed of 20 m.p.h., with the spark in the normal driving position. The grade was then ascended at the same constant speed, the throttle being opened

gradually to maintain this speed. Observations were made of the overall noise level at fixed stations on the level stretch and on the ascending grade. Three successive runs were made on each fuel sample.

Determines Knock Rating Levels

From data compiled after the tests, graphs were drawn of the noise level as indicated by the audiometer, referred to the distance in feet up the grade from the start of the slope. The integrated average noise level was then determined for the first 700 ft. and for the section from 1100 to 2000 ft., which sections had a fairly constant grade. The integrated average values of the overall noise were taken as knock level ratings.

The audiometer was used also by the sub-committee on detonation of the Cooperative Fuel Research Committee in preliminary cooperative tests held at Willow Grove, Pa., quite recently. The writer understands that some of the members of the sub-committee objected that the instrument as now used fails to differentiate between knocking and general engine noises. It was pointed out that the knock generally has a frequency of about 3500 cycles per minute, while the frequency of the general engine noise is around 3000 cycles per minute, and it was suggested to the Bell Laboratory representative that if the instrument could be developed to eliminate the latter frequency, it probably would be much more useful.

Cooperative tests intended as an aid in developing a standard road test for anti-knock quality of fuels are to be held at Uniontown, Pa., in the near future. No less than eleven different fuels and twelve makes of car will be used in these tests. Representatives of Vacuum Oil Co., Standard Oil Development Co., General Motors Research Laboratories, Sun Oil Co., Ethyl Gasoline Corp., Universal Oil Products Co., The Atlantic Refining Co., The Texas Co., The Shell Petroleum Corp., the Standard Oil Company of New York, Yale University and the Bureau of Standards will participate, among others. The procedure to be followed in these tests will be as follows:

The car, carrying a number of observers besides the driver, will be accelerated from a low speed up hill. Each observer will note the intensity of the knock at different definite speeds, up to and including the speed at which the knock completely disappears and does not appear again. Knocking intensities will be gaged directly by ear, and the procedure otherwise will be much the same as in the Long Island tests previously described, except that the cars will be slowly accelerated instead of being driven up the hill at constant speed. Preliminary tests made with this method by Ethyl Gasoline Corp., General Motors Laboratory and Standard Oil Development Co. are said to have shown that very good agreement is arrived at by different observers as to the rating of the different fuels on the road. It is further pointed out that the Sinclair Refining Co. has for a long time used a laboratory method by which knock intensities are compared by ear, and has been quite successful in obtaining reproducible ratings.

One fact that makes a standard procedure for road tests of anti-knock quality seem quite important is that the results of road tests often do not accord with those of the standard octane-number test. The discrepancy is likely to be particularly great where fuels of different types are concerned. Let us suppose, for instance, that the method of accelerating the car and recording the speed at which knocking ceases is being employed. Let us also suppose that we have two series of fuels, one series of straight-run gasoline and the other of the cracked type. Each grade of fuel has an octane rating, and the road test will give for each grade of fuel a definite speed at which knocking ceases. If now we plot octane numbers against speed of cessation of knocking on acceleration, we find that for the same type of fuel the points lie fairly close to a median curve or line, but that there are separate curves for the different types of fuel, which are rather far apart. In other words, a straight run gasoline with which knocking ceases at a given speed, will have an octane number differing by perhaps six points from that of a cracked gasoline with which knocking ceases at the same speed, and the difference may even be as great as eight or twelve points.

Change Jacket Temperature

It has also been shown that the octane numbers of different fuels are dependent to quite an extent upon the temperature of the combustion-chamber wall of the engine in which they are determined, and one of the possible means of bringing the standard octane number in accord with the result of the road test of anti-knock values, would be to change the jacket temperature of the C. F. R. engine in the standard procedure. This temperature is now specified as 205-215 deg. F. To give a specific example, a certain straight-run fuel which shows an octane number of 66 under standard procedure, ceased knocking at 25 m.p.h. in the acceleration test. The same fuel when tested in a high-compression engine (130 lb. p. sq. in.) with its jackets maintained at 362 deg. F. and operated at 900 r.p.m., showed an octane number of 69. On the other hand, a cracked fuel ceasing to knock at the same speed has a standard octane rating of 71, while the same fuel tested in the high-compression, high-temperature engine has an octane rating of 64.5. From this it would seem that an octane number test carried out with the engine cooling system at an intermediate temperature, say, 300 deg. or higher, should give results that would agree well with the acceleration test of anti-detonating quality.

However, the type of cylinder head and the engine speed also seem to affect knocking with different types of fuels differently, and there is no doubt that the C. F. R. Committee, and especially its Sub-Committee on Methods of Measuring Detonation, has a knotty problem before it in so coordinating the procedures for laboratory and road tests that they will yield concordant results.

IN a recent interview printed in a London publication, Sir Josiah Stamp said that each of the British railway companies had tested several designs of railcar for a couple of years, and that about 170 such cars were now running on British railroads. He added that the difficulties of finding a suitable vehicle were very great. It is worth noting in this connection that most of the British railcars are steam operated, but recently the attention of the railroads has been directed to the oil-electric type, and two rail coaches built by Sir W. G. Armstrong, Whitworth & Co., Ltd., equipped with Beardmore, 250-hp. engines will shortly be placed in regular service.

JUST AMONG OURSELVES

Leisure Can Be Busy With Happiness

THOMAS HUXLEY once wrote a friend, "If I could only break a leg, what a lot of scientific work I could do." Commenting on this quotation the Industrial Bulletin of Arthur D. Little, Inc., says:

"We all long for leisure, for some portion of time at our command to make use of as we will, yet when leisure is forced upon us it is apt to be regarded as a misfortune, rather than as a boon. He is the unusual and happy man who can welcome it as his opportunity for some worthy and long-deferred activity."

A Champion of Champions Performs

THE strong man in a small traveling circus was in the habit of closing his act with the feat of squeezing all the juice from an orange by crushing the fruit in one of his powerful hands. Then he would offer a prize of $5 per drop to any man in the audience who could squeeze out another drop. So great was the power of his good right hand that in many years he never had paid the $5 premium to anyone.

One night after going through his usual performance, straining every muscle and finally dropping the dry orange on a table, he made the usual offer which was accepted by several burly looking townsfolk, all of whom squeezed and squeezed with the usual lack of success.

Finally a small, insignificant looking little man stepped up from the audience and meekly asked that he be allowed to try. Picking up the orange, he began to squeeze. To the amazement of everyone a large drop finally came out, then another and finally a third one. He dropped the orange back on the table quietly and turned expectantly to get his promised $15.

The strong man reluctantly passed him over the bills saying: "I certainly am amazed. In all my travels I have never had to pay money on this offer before. But you have earned it and here it is. The performance is so unusual, though, that I'm curious to know more about you. Would you mind telling me what your regular occupation is?"

"I'm a purchasing agent," came the reply.

Who Wants to Manage a Railroad?

THE public statement issuing from the Association of Railway Executives on July 20 seems to us to have been an unusually appealing and intelligent document, particularly where it says:

"There is no doubt that the railroads, if given equality of opportunity, will surmount the present difficulties. To accomplish this we believe that it is essential, in addition to all that the railroads may do for themselves, that the existing regulations of the roads should be relaxed so as to restore freedom of managerial control.

"The railroads do not expect or seek favors from the government, but they do ask equality of freedom with all other agencies of transportation."

No one can look at all deeply into the red tape with which railroad managers are surrounded on every side and not feel the difficulty under which these managers labor in attempting to move quickly and firmly enough to meet competitive conditions. The general manager of an automobile plant would be unable to produce vehicles at even double the present cost under similar hindrances.

Rails Demand Company in Misery

THE automotive industry, it seems to us, has much to gain from aiding the railroads in any fight which they may make for removal of restrictions and increase of flexibility in management and policies. Given an opportunity to compete freely on every front, the carriers could no longer reasonably demand hampering and uneconomic restriction of highway transport agencies.

The same statement referred to, however, shows clearly that the railroad men are determined to carry on their destructive fight against complete economic development of the highway carriers. They say in effect, "If we can't get relief from governmental restrictions which have throttled us, we want every other form of transportation throttled too." Couched in the diplomatic manner of the official statement, this reads:

"If, in the public interest, restrictions of the kind mentioned, among others, are necessary for the railroads, they would seem to be no less necessary for other transportation agencies."

The fight for protection of the interests of highway users must go on vigorously for some years yet, but it is encouraging to hear the rail carriers talking more and more about removal of restrictions from their own operations.

—N.G.S.

Economic Advantage of Diesel Depends Upon Annual Mileage

German report indicates advantage of oil-fuel powerplants begins at 8000 miles per year, but appreciable savings can be expected only if vehicles are run more than 12,500 miles annually

TO the accounts of French and English studies of the economics of Diesel bus and truck engines published in recent issues of *Automotive Industries* we are now able to add some results of a German investigation of the subject. This project was undertaken by Fr. Eichelhardt and Fr. Eisenmenger, at the instance of the Union of German Motor Transport Companies, who have embodied the results of their investigations in a 40-page pamphlet with eight tables, entitled Calculation of Operating Cost of Diesel Buses and Trucks, published by Fr. Ruhfus in Dortmund. A review of the publication appeared in the June 25 issue of *Automobiltechnische Zeitschrift.*

Since certain of the fixed costs, such as amortization and interest on investment, are greater in the case of the Diesel vehicle, while its fuel cost is less, it follows that the economic advantage of the Diesel-equipped bus or truck is dependent upon the annual mileage.

In a city bus service the higher fuel cost of the carburetor engine adds to the operating cost, particularly if vehicles follow one another at short intervals and make frequent stops. According to the results of the investigation, for an annual mileage per vehicle of 37,500, the operating costs of Diesel and carburetor engined buses of different sizes compare as follows:

Cost per Vehicle-Mile in Cents

	60-Passenger	44-Passenger	36-Passenger
Diesel engine	29.3	27.2	25.2
Carburetor engine .	31.6	29.5	27.2

Hence, the operating costs are about 8 per cent lower with the

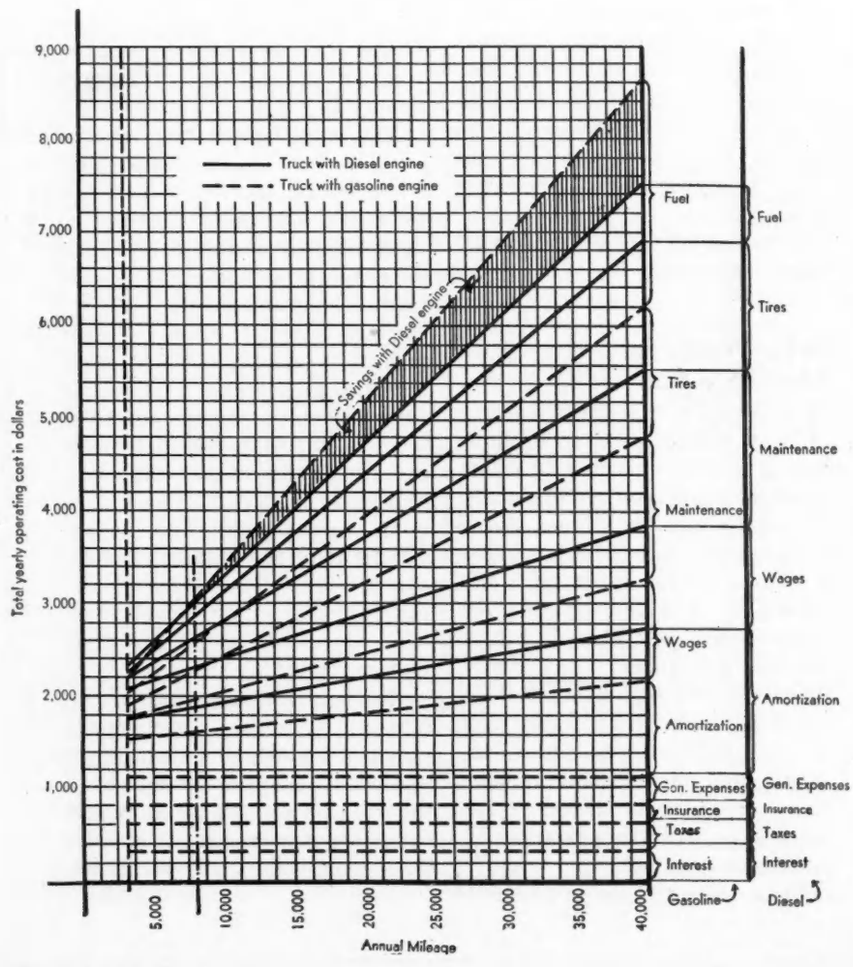


Fig. 1—Chart showing variations of items of bus operating cost with annual mileage

Diesel than with the carburetor engine. On the other hand, if the annual mileage is less than 8000, the operating cost of the Diesel-equipped vehicle is greater than that of the carburetor-engined vehicle. The economic limit of the Diesel engine seems to lie close to 8000 miles per year, but any material savings can be expected only above about 12,500 miles per year.

The authors also investigated the advantages of the Diesel engine in truck operation and prepared the chart Fig. 1 which is based on the following conditions:

	Diesel	*Carburetor*
Interest on investment	8 per cent	8 per cent
Amortization for 25,000 miles per year	24 per cent	20 per cent
Wages	$772	$772
Vehicle maintenance per mile	4.24 cents	3.85 cents
Tire covers	25,000 miles	25,000 miles
Tire tubes	50,000 miles	50,000 miles
Fuel consumption	7.35 m.p.gal.	5.22 m.p.gal.
Fuel price	11.7 c.p.gal.	31.5 c.p.gal.

The authors base the assumption of higher depreciation of the Diesel engine on the lack of experience regarding its life and technical imperfections still to be overcome, to which might be added the rapid technical progress in their design which naturally tends to accelerate their obsolescence. Since the comparison was made, fuel prices in Germany have decreased materially, the price of gasoline more than that of gas oil, and the comparison for that reason slightly favors the Diesel under present conditions. In truck service, therefore, the same as in bus service, the economic limit of the Diesel engine is a minimum mileage of approximately 8000 per year, and material savings can be expected only with annual vehicle-mileages of over 12,500. (Fig. 2.)

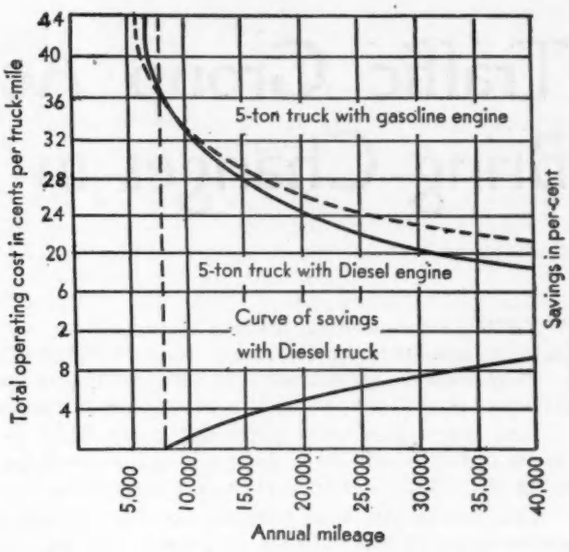


Fig. 2—Variation of operating cost of 5-ton Diesel and gasoline trucks with annual mileage

Bureau Studies the Resistance to Fatigue Of Steel When Coated With Some Other Metal

THE effect upon the resistance of metals to fatigue of coating them with some other metal depends upon the nature of the bond between the metal and the coating, according to Research Paper No. 454, which will be published in the July number of the Bureau of Standards *Journal of Research.*

It has been shown by numerous investigations that the surface condition of a metal is a very important factor in determining its resistance to repeated stresses. Surface alterations caused by corrosion, either previous to or coincident with stressing, are known to cause a marked lowering of the normal endurance limit of a metal. Metallic coatings are widely used to protect iron and steel from corrosion, and it has been shown that such coatings may appreciably improve the resistance of metals to simultaneous stress and corrosion.

It is of interest to know what effect protective metallic coatings may have upon the endurance limit of metals when corrosion is not involved. A study has recently been made at the Bureau of Standards of the effect of hot-dipped galvanized coatings and of electro-deposited zinc coatings upon the endurance limits of three ferrous materials: open hearth ingot iron containing 0.02 per cent carbon and two plain carbon steels containing 0.45 per cent and 0.72 per cent carbon.

Endurance limits were determined on specimens of each material that were: (a) polished but uncoated; (b) galvanized by the hot-dip process; (c) zinc electroplated, and (d) acid pickled as for galvanizing.

The ingot iron was tested in the hot-rolled condition. Both of the carbon steels were tested in the normalized and annealed, in the quenched, and in the tempered conditions. Fatigue tests of the galvanized and the uncoated specimens were made on both R. R. Moore rotating beam, and on Haigh axial loading fatigue, testing machines.

The acid pickling caused a decrease in endurance limit of as much as 40 per cent, the greatest decrease occurring in the quenched steels. The presence of a galvanized coating caused a still greater decrease in most of the materials, the maximum, 42.5 per cent, being obtained in the quenched or the tempered steels. The endurance limits of the electroplated materials were equal to or greater than those of the polished, uncoated materials.

The difference in the effects caused by the two types of coating is believed to be a result of the differences in the nature of the bond between zinc and steel and differences in structure and hardness of the two coatings.

Traffic Group Action and Heavy Fines Bring Changes in Railroad Rules

FREIGHT rate and car loading technicalities are just so much Greek to the averge automotive executive, but when several companies get their fingers burned with $8,000 to $10,000 fines for violation of those technicalities everybody begins to get interested.

And that's just what happened lately when several car manufacturers and railroads were fined and others indicted on charges of violating the Elkins Act involving rate discrimination.

The indictments were founded on technicalities in ordering freight cars wherein it was claimed the tariff rule was violated. That rule, J. S. Marvin, general traffic manager, N.A.C.C., explains to us, in effect permits railroads to furnish and shippers to use a longer car when the order is for a shorter car. If a 36 ft. car is ordered, for example, and the railroad hasn't any at hand, but has a 40 ft. car available, it may let the shipper use the 40 ft. car and assess the minimum carload weight that would have been applicable to the 36 ft. car.

The Interstate Commerce Commission inspectors claim to have found cases where the longer cars were charged the shorter car minimum, while records failed to disclose short car orders. Hence the indictments and subsequent fines in several instances.

Then came a further complication. The rule says that the short car minimum weight (on which freight charges are based) prevails only if the capacity of the longer car is not utilized. *But* in shipping automobiles the load has to be spread over the whole car in order to get proper adjustment of the bracings. The railroad classification committee put it up to railroad agents to decide whether the capacity was utilized. Hence the decision of automotive traffic men that the legal minimum could not be determined regardless of car order records. They simply insisted that the railroads bring in cars of the length ordered, regardless of the difficulty this might involve for the railroad.

At best, however, this insistence was generally looked upon as a temporary protective measure. It is not in the interest of permanent, overall efficiency of operation from the standpoint either of the railroads or the shippers.

And now, it seems, a real, practical solution of this pressing problem is at hand. Officials of the Central, Eastern Trunk Line and New England traffic zones have agreed to change entirely the method of assessing carload minimum weights. Instead of having nine minima according to the length of the car as has been the case in the past, there are to be just two minimum weights.

Cars up to 40 ft. 6 in. inside length will be assessed on a minimum weight of 10,000 lbs. Longer cars will be subject to a minimum weight of 12,500 lbs. All doubt of legal minima is removed.

This proposal, which is in accordance with the suggestions made to the carriers by the Traffic Committee of the National Automobile Chamber of Commerce, has now been accepted in principle by the officials mentioned. Tariffs covering the new plan are in preparation. It is expected they will include shipments to Western Trunk Line territory, although a lower minimum, 12,000 lbs., has been fixed by Western Trunk lines for shipments in the longer cars *within* that territory.

"Departing from the general rule that is entirely unsuited to automobile shipments" (different minima for each foot of freight car length), says Mr. Marvin, "carriers will now be able readily to make any additional adjustments or extensions of the plan that may be found desirable."

Auto Co., Railroad Fined $8,000 by U. S.
Elkins Shipping Act Violations Charged in Federal Court by I. C. C. Agents
PLEAD GUILTY
Shipper, Using 40-ft. Cars, is Charged for 36-footers
DETROIT, MICH., June 4.—The New York Central Railroad was fined $10,000 and the DeSoto Motors Corporation was fined $12,000 today, when Federal Judge Edward J. Moinet passed sentence upon the two companies for violations of the Elkins act.
Reo Pays $8,000 in Federal Court
Manufacturer Pleads Guilty in Federal Court
LANSING, MICH.—The Reo Motor Car Co. Thursday paid a fine of $8,000 in Federal Court for violation of the Elkins Act.
RAILROAD FINED
New York Central and DeSoto Motors Plead Guilty.
DETROIT, June 4 (A. P.).—The New York Central Railroad Company was fined $10,000 and the DeSoto Motors Corporation, $12,000, today by Judge Edward J. Moinet in Federal Court when their representatives pleaded guilty to indictments charging violation of the Elkins act, involving rate discrimination.
Interstate Commerce Commission investigators who checked up on freight rates reported that the New York Central was providing forty foot cars for automobile shipments, but charging for thirty-six-foot cars. On this finding the Government based the charge of discrimination.
U. S. COURT FINES RAILROAD, DE SOTO
Shipper and Manufacturer Plead Guilty to Elkins Act Violations
$8,000 Fine Paid by Reo Motor Co.

Reo's First Eight Truck Announced

(Continued from page 163)

radius rods. The list price on this model is $3,645, and the rating is 20,000-3¾-38. The tractor unit rating is 32,000-1½-43, and the special tractor with the equipment cited above is 32,000-2-36.

The powerplant in the 2-ton truck is an enlarged edition of the Gold Crown engine used in Reo's new 1½-tonner. It develops 75 hp. for a chassis weight of 3735 lb.

With these trucks, as formerly, Reo is offering a complete line of standard bodies and also on order virtually any special body desired.

To return to the 4-tonner, there are two more items, which while apparently minor indicate the extensiveness of the engineering work carried on to insure a minimum of operating trouble. The fuel pump is provided with a shield to keep off heat from the exhaust manifold, and the fuel line from the tank is insulated and carried on the outside of the frame channel—both as a protection against vapor lock.

The B-K booster brake system installed as standard on the 4-tonner is of the vacuum suspended type. It gives quicker action and more pressure than previous types and is more readily adaptable to trailer installation also for these reasons.

Reo Truck Specifications

Model Designation	2 B—2 D	4 H—4 J—4 K
Conventional rating	2 ton	4 ton
Total gross rating	11,000 lb.	20,000 lb.
Ability rating	11,000—4¼—47	20,000—3¼—42
Standard wheelbase	142 in.	150 in.
Max. wheelbase	166 in.	190 in.
Tires—front	6.50-20	9.00-20
Rear	6.50-20 dual	9.00-20
Rim size	5 in.	7 in.
No. of cylinders	6	8
Bore and stroke	3⅜ x 5	3⅜ x 5
Piston displacement	268 cu. in.	358 cu. in.
N.A.C.C. horsepower	27.3	36.48
Actual horsepower	75 at 2800 r.p.m.	110 at 2800 r.p.m.
Valve arrangement	L-head	L-head
Camshaft drive	Chain	Chain
Piston material	Lo-Ex aluminum	Aluminum alloy
Diam. of main bearings	2 5/16 in.	2⅝ in.
Length of main brgs.	12 in.	12.53 in.
No. of main bearings	7	9
Oiling system	Pressure feed	Full Pressure
Carburetor size	1¼ S.A.E.	Duplex 1¼
Make	Schebler	Schebler
Fuel feed	Fuel pump	Camshaft pump
Radiator type	Tubular	Fin and tube
Water pump	Centrifugal	Centrifugal
Gasoline capacity	15 gals.	26 gals.
Oil capacity	6 qts.	8 qts.
Type of ignition	Battery	Battery
Voltage	6-8	6-8
Make	Willard	Willard 119
Clutch, type	Single plate	Double plate
Size	11 in.	11 in.
Transmission, type	Selective	Selective
No. forward speeds	4	4

Model Designation	2 B—2 D	4 H—4 J—4 K
Reduction in low gear	6.6 to 1	6.6 to 1
Type universal joint	Cleveland No. 385	Cleveland No. 585
Rear axle, type	Full floating	Full floating
Final drive	Spiral bevel	Spiral bevel
Gear ratio	5.83	7.17 to 1
Standard	38.48 to 1	47.32 to 1
Drive and torque	Hotchkiss	Through springs
Radius rods	None	Extra
Front axle, make	Reo	Reo
Type	Reverse Elliott	Reverse Elliott
Beam section	"I" beam	"I" beam
Steering gear, type	Cam and lever	Cam and lever
Steering wheel	17 in. diam.	20 in. diam.
Brakes, service	Hydraulic	Internal hydraulic
Size	Fr. 15 in. x 2¼ in. Rear 16 in. x 2¼ in.	Fr. 16 in. x 2½ in. Rear 17¼ in. x 4 in.
Area	289 sq. in.	390 sq. in.
Hand brake external	8 in. x 2 in.	Disk type 14 in.
Frame, section	7 1/16 x ¼ x 3	10 x 3¼
Width of frame	34 in.	34 in.
Springs, front, semi-elliptic	2¼ x 40 in.	44 x 3
Rear, semi-elliptic	2½ x 52 in.	56 x 3½
Helper springs	Over axle	Over axle
Tread, front	59 13/16 in.	63¼ in.
Rear	65⅛ mean	71¾ mean

Body Mounting Data	142 in. wb.	166 in.	150 in.	170 in.	190 in.
Dash to axle	113½	137½	116	136	156
Dash to end of frame	158¼	193⅜	147	196	216
Back of cab to center of rear axle	60½	84½	63	83	103
Back of cab to end of frame	105¼	140⅜	94	143	163

Chapin Named Secretary of Commerce

WASHINGTON, D. C., Aug. 4—Roy D. Chapin, chairman of the board, Hudson Motor Car Co., has been named Secretary of Commerce by President Hoover, succeeding Robert P. Lamont.

Following his interview with President Hoover, Mr. Chapin expressed himself as seeing a bright business outlook ahead. "There is no lack of buying power in this country," he said. "Many business men have been held back by fear and this apparently is lessening. There is a general belief throughout industry that the steps taken by the Administration to alleviate the economic situation are going to be extremely helpful in stimulating business and providing employment. That is what we are all fighting for."

Mr. Chapin is the first automotive executive in the history of the industry to become a member of the Cabinet although several others of the industry's leaders have served the Government in high official posts. John N. Willys, chairman of the board, Willys-Overland Corp., has just returned from several years' service as Ambassador to Poland, while J. Walter Drake, formerly chairman of the board of Hupp Motor Car Co., served for some time as Assistant Secretary of Commerce during the time that Herbert Hoover was Secretary of that Department.

For years an active figure in international as well as national affairs pertaining to the automotive industry, Mr. Chapin is admirably qualified to occupy so important a post at this critical time. Although only 52 years old, he has

(Turn to page 179, please)

New Commerce Secretary

Roy Dikeman Chapin

". . . Business has been held back by fear, which is lessening"

Fig. 1—A 3-in. anti-aircraft gun ready for the road. Note how folded outriggers form the trailer body

Arc Welding Process Ordnance Manufacture,

Rigid rule against welding gun-carriage structures is rescinded following test work. Design problems simplified as modern practice takes place of cast steel top of motorized 3-in. field artillery pieces

by G. M. Barnes

Major, U. S. A., Chief of Design and Engineering Division, Watertown Arsenal, Watertown, Mass.

MODERN welding had never been used in the construction of gun carriages by the U. S. Army Ordnance Department, until the work, described here, was undertaken at the Watertown Arsenal. In fact there was a strict ruling against the use of any welding whatsoever in connection with gun and gun carriage work. It was considered that welding was not only an unsatisfactory method of construction, but dangerous, as practically all parts of the carriages were called upon to resist large impact forces.

The 3 in. anti-aircraft mount shown in Fig. 1 was selected as the best carriage to test the possibilities of welding gun carriages. This carriage was under production at Watertown Arsenal. It was on wheels, and its members were subject to severe road shocks in addition to the impact forces due to firing. The principal parts of this carriage were highly stressed and of intricate design.

The 3 in. gun carriage is shown in the traveling position in Fig. 1. It is folded so as to form as compact a traveling load as possible. The unit is trailed over roads and across country behind a suitable prime mover. Although weighing 8 tons, the carriage can successfully travel at speeds up to 40 m.p.h., without damage to the various mechanisms.

In the firing position, the front and rear two wheel bogies are removed and the mount lowered to the ground by means of screw jacks built into the carriage. The long arms, called outriggers, in this position have been opened and stand at 90 deg. to each other when flat upon the ground. The mount is so designed that although it is not anchored to the earth in any way, it will not move or lose its orientation when the gun is fired rapidly.

Important steel castings, such as the top carriage, are thoroughly X-rayed at the arsenal before being accepted for use as gun carriage parts. Many of these castings when X-rayed were found to have shrinkage cracks, sometimes in the main arms and sometimes near the trunnion supports. The number of rejections became alarming.

In attempting the redesign of the top carriage it was of course necessary that the new part have the same general exterior contour as the cast steel top carriage, in order that no other adjacent members would require modification. It was decided to use a medium carbon steel plate ½ in. thick, which would produce a top carriage of about the same weight.

A number of these welded steel top carriages were then constructed, assembled to carriages under manufacture, and issued to the Proving Ground and Using Service for tests. All were found to be satisfactory and passed all tests.

Found Weight Saving Practicable

These experiments convinced the writer that this member could be successfully made of ¼ in. nickel steel, thus securing an important saving in weight. Weight saving is of great importance in mobile gun carriages, as it is in the case of mobile commercial vehicles and machines.

An experimental top carriage of ¼ in. nickel steel was next designed and built. The construction followed that of the ½ in. welded top carriage, except that light forged caps welded to supporting ribs were substituted for the separate forgings at the trunnion bearings and a stem of drawn seamless tubing was used.

When completed, the relative weights of the cast steel and the welded top carriage of ¼ in. nickel steel were as follows:

Cast Steel	975 lb. (in rough)
Welded ¼ in. Nickel Steel	607 lb. (in rough)
Saving in Weight	368 lb. (or 37.7%)

This welded top carriage is shown in Fig. 2. The pedestal was the next part of this carriage to be considered for welding after a success had been made of the welded top carriage. It was decided to go the limit

*This is a brief of a paper which was awarded second prize in the Second Lincoln Arc Welding Prize Competition sponsored by The Lincoln Electric Company, Cleveland.

Revolutionizes Arsenal Finds

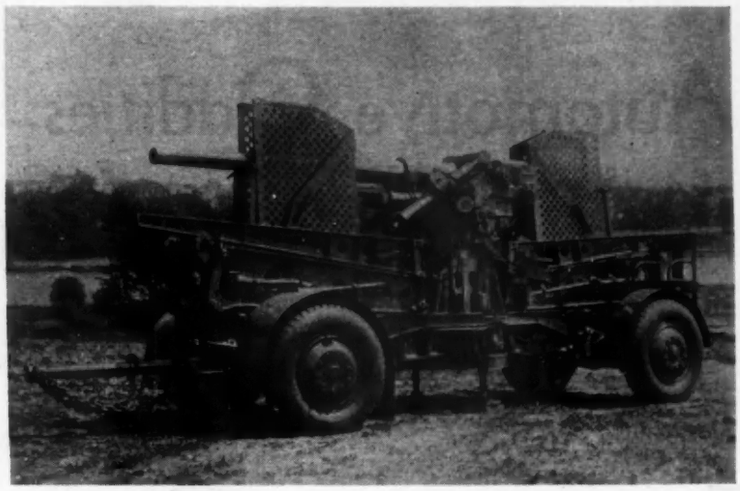


Fig. 2—Welded top carriages made from 1/4-in. nickel steel

at once in the design of this part, in making it of the lightest possible material consistent with strength and rigidity. For the sides of the pedestal, 5/32 in. nickel steel plates were selected, while ¼ in. and ½ in. nickel steel plates were used for other parts.

The relative weights of the cast and welded pedestals shown in Fig. 4 were found to be as follows:

Cast Steel Pedestal (finished machined)	1115 lb.
5/32 in. and ¼ in. Nickel Steel Pedestal (finished machined)	823 lb.
Weight Saving	302 lb. (or 27%)

The intermediate and outer outriggers are folded so as to lie above the main outrigger when traveling. When the carriage was first built the inner and intermediate members were made of cast steel of the same quality as used for the top carriage and pedestal. The outer member was constructed of cast steel ends to which steel plate was riveted.

A study of the bogie frame indicated that it could be made an integral unit by using welded nickel steel plates, thus eliminating all the machining previously required to permit the five separate castings to be joined together. The weights of these frames are as follows:

	Front Bogie Frame	Rear Bogie Frame
Cast Steel	590 lb.	558 lb.
Welded Nickel Steel	430 lb.	380 lb.

This frame illustrates very nicely one of the advantageous characteristics of welding; that of making it possible to weld separate members into a unit, thus eliminating all intermediate machine work which was formerly necessary to permit the separate castings to be assembled.

Welding, as a result of this pioneering work which has been done at Watertown Arsenal, has become so well established as a process of manufacture that several new types of Ordnance have been built recently, in which welding was adopted at the outset so that the parts were designed originally as welded members. When this is done the welded parts are invariably lighter, less complicated, more easily fabricated and considerably cheaper.

Chapin Named Secretary of Commerce

(*Continued from page 177*)

been in active automotive work for more than 30 years. He had his initial training at Olds Motor Works, becoming general manager in 1904. He became general manager of the newly formed E. R. Thomas-Detroit Co. at the age of 26. Then in 1908, a new group was formed by Mr. Chapin who, with Howard Coffin, interested Hugh Chalmers in the automobile industry. The company name was changed to Chalmers-Detroit Co. and Mr. Chapin was general manager and treasurer.

Less than a year later the Hudson Motor Car Co. was organized and in 1910 the two companies were separated, Mr. Chapin becoming president of Hudson at the age of 30. He continued in this position until 1923 when he resigned to become chairman of the board.

Mr. Chapin has always been active in the work of highway development and has devoted much of his time in recent years to promotional activity along these lines. He was one of the initial sponsors of the Lincoln Highway and was one of the first proponents of the Federal Highway Act, which requires that all interstate roads shall be built on the basis of their economic necessity if they are to get federal aid.

He was chairman of the Transport Committee of the Council of National Defense during the World War and in recognition of his services in the highway transportation he was awarded a degree of Master of Arts by the University of Michigan in 1922.

He was president of the National Automobile Chamber of Commerce in 1927 and 1928, having previously served as vice-president for a number of years. He is still active in the Chamber, being a member of the board of directors, of the trade promotion committee, the representative on the Highway Education Board, a representative in the International Chamber of Commerce, chairman of the taxation committee and chairman of the highways committee.

He was born in Lansing and his home is now at Grosse Pointe Farms, Mich.

Automotive Oddities—By Pete Keenan

CAST IRON IS MAGNETIC
NICKEL IS MAGNETIC
+
YET WHEN THESE ELEMENTS ARE MIXED IN CERTAIN PROPORTIONS THE RESULTING ALLOY IS NON-MAGNETIC. (TWO POSITIVES MAKE A NEGATIVE)
Nickel Cast Iron News.
HAZEL WOOTTON OF ENGLAND ONLY 15 YEARS OLD IS A PARACHUTE JUMPER.
THE OLDEST MILE STONE. THE FAMOUS "LONDON STONE" IN OLD ST. SWITHINS CHURCH. LONDON
It Dates back to Roman London.
GEORGE MOSTECA LOST HIS CAR IN A SNOW DRIFT AND LOCATED IT THREE MONTHS LATER WITH A SOUNDING ROD. Marysville Cal.

The News Trailer

Write us if you know an oddity

Victor William Kliesrath (Bragg-Kliesrath Corp.), who defended the Gold Cup last year at Lake Montauk, will drive John Wanamaker's Louisa on Aug. 13. Hotsy-Totsy, Speedman Kliesrath's boat, will not be entered.

Fred S. Pearse, Dodge machine shop head, brought back from St. Thomas, Canada, the King Edward VII trapshooting trophy recently to add to his large collection of mementos of quick eye, quick trigger finger.

Not the heat, but humidity, won an order for electric refrigeration when the statistical division, Army Air Corps, Dayton, found its engine data cards all curled up from moisture.

8459 electric lamps spell out "Chrysler" on the great 300-ft. **sign** in Detroit. . . . Readable for five miles. . . . Consumes 211 kw. hr. . . . Floods the sky with 263,075 cp. . . . Its location has been passed by more than 100 million people in three years.

An automobile horn, which was sounded by a short circuit in the electrical wiring of the car, averted its destruction by fire. If it only had one of those "How Dry I Am" horns to sound the alarm!

Despite general depression, civil and foreign battles, floods and famines, imports of motor vehicles into China for the first quarter of 1932 exceeded those for the same period of last year by nearly 15 per cent.

Recently a rush consignment of Ford plane parts was delivered in Lima, Peru, nine days after its shipment from the Ford airplane factory at Dearborn, Mich.

NEWS

"Canadian Content" Argument Starts Behind Scenes at Imperial Confab

Canada Puts Many Automotive Items on "Empire Free List." Motor Executives Hasten to Ottawa. Klein in Radio Talk Demands Fair Play for U. S.

OTTAWA, Aug. 2 — Behind closed doors and in the corridors of the Imperial Economic Conference now in session here, there have been many informal references to matters directly affecting the automobile industries of England, Canada and the United States, although the first ten days of the Conference rolled by without a single mention by any public or official source of automobiles or the motor industry.

Judged by these discussions, the main issue has to do with the so-called Canadian content of automobiles turned out in the Dominion. There has been some talk about a condition within the Empire which approaches free trade. If the free trade plan were to apply, it would mean that all cars labeled as manufactured in Canada would have the privilege of free entry to other British countries. But there are two types of automobiles turned out in Canada. One is manufactured in the Dominion, the other is assembled in Canada from parts made in the United States. This is where the difficulty really starts, it is claimed.

Those companies manufacturing cars with 50 to 75 per cent Canadian content have already intimated that it would be unfair to allow cars with only 25 per cent Canadian content to participate in any Empire trade arrangement. The argument has been advanced among Canadians at the conference that the heavy percentage of the payroll comes in the machine shops, not in the assembly sections of the plants. Therefore Canadians do not benefit very substantially in the case of cars that are merely assembled in the Dominion. Ultimately, this does not help the Empire generally.

These preliminary discussions at the conference have only served to emphasize that the situation with regard to the automobile industry has its complexities for both Canada and the Empire at large, particularly with England a direct competitor with Canada in the markets of the other Dominions. At this writing nobody has openly suggested what can be done about it. There is only an expression of hope for a solution for stimulated business —with fairness to both Canada and Britain.

The statement made over the radio last week by Julius Klein, Assistant Secretary of Commerce of the United States, is of interest in this connection. Referring directly to the Imperial Conference, Dr. Klein said:

"We earnestly hope that when the Imperial Conference now in session at Ottawa deliberates upon the question of the necessary percentage of British-Empire labor and materials to be employed in these American branch factories, its final decision will be of such a character as not to impair this healthy industrial development which is so valuable to the Dominion of Canada."

Executives Hurry to Ottawa

TORONTO, Aug. 4 — Definitely alarmed at possibilities of action by the Imperial Conference unfavorable to United States' automotive interests, chief Canadian executives of several important American companies have hurried to Ottawa for discussion with Canadian government or British Empire delegates.

Automotive leaders who have gone to Ottawa include J. D. Mansfield, president and general manager, Chrysler Corp. of Canada, Ltd.; W. R. Campbell, president and treasurer, Ford Motor Co. of Canada, Ltd.; and D. R. Grossman, v.p. and general manager, Studebaker Corp. of Canada, Ltd. The startling information has been divulged that the Canadian Government has included a number of important automotive items in an extensive list of articles imported from the United Kingdom and other British countries on which Canada is prepared to remove the duty entirely as a concession to the Empire. In this list there is no reference to the much-discussed subject of "Empire content" of labor, materials or factory overhead, the offer being complete in itself, thereby granting a distinct tariff advantage to the British automotive industry.

Items included in the list offered by Canada for free entry when imported from other British countries are: Steel automobile chassis; many automobile parts and accessories which are applicable to cars made in Canada or to United States models imported into the Dominion.

The so-called free list is receiving the further consideration of a Canadian sub-committee of the Conference.

N.S.P.A. Approves Joint Parts Show

DETROIT, Aug. 2—The jobber and manufacturer divisional committee and the board of directors of the National Standard Parts Association voted unanimously last week in favor of carrying through plans for a Joint Trade Show scheduled for Detroit next December.

This year show invitations will be issued to a list of approximately 3000 jobbers on the guest list and while there may be a decrease in attendance of small jobbers from distant points, the association believes that such will not be the case in the central and more populous areas.

To further encourage jobber attendance, it is proposed to give them four days of admission instead of three days as heretofore.

Ford at Milwaukee Drops in August

MILWAUKEE, Aug. 1—The Milwaukee Ford assembly plant has reduced operating schedules for August, gaging output to current demand. The working force of 850 has been cut to 450 and the plant will operate four days a week, eight hours a day, instead of five days. Total output for this month will be between 800 and 900 units. Production of the new V-8 will represent 90 per cent of passenger car output, or 75 per cent of total assemblies.

New Hope Roused for Fall Business Despite July Sales Drop from June

Final Figures Show June to Have Been High Month for 1932 in Both Sales and Production. Greater Confidence Evidenced in Reports From All Sections

DETROIT, Aug. 6—With final figures showing June to have been the biggest month the industry has had in both sales and production, and with commodity and security prices thus far in August showing definite advances over previous lows, automotive men are talking optimistically again despite decline in July totals.

June sales, totaling about 149,000, topped May by 13.5 per cent, final R. L. Polk & Co. figures show, thus confirming closely the preliminary estimate made in these columns last week. Passenger car production too reached new 1932 heights in June, exceeding those of May by a narrow 1 per cent, due entirely to Ford's return to high output totals. The rest of the industry, excluding Ford, built 17 per cent less cars in June than in May. Truck production declined in June nearly 23 per cent from the May totals. Final figures for the month show:

Passenger Car Production

June, 1932	166,646
May, 1932	165,025
June, 1931	215,979

Truck Production

June, 1932	23,558
May, 1932	28,345
June, 1931	41,496

July totals ran behind those of June for both cars and trucks, but sales executives contacting dealers during the last few weeks are almost unanimous in reporting an improvement of sentiment in practically all territories. No definite upswing in sales is expected, but hope is arising that fall business in motor vehicles may run behind that of 1931 to a less extent than it has during the first two-thirds of the year.

G. M. Query Seeks Buying Reasons

Asks Answers to 16-page Booklet in an Ambitious Consumer Research Plan

DETROIT, Aug. 1—One of the most ambitious of all questionnaires, a 16-page booklet which has been addressed to automobile owners throughout the country, has its source in General Motors Corp. So elaborate is the mailing piece that the return envelope carries a six-cent stamp.

Primarily the questionnaire seeks to discover reasons underlying the purchase of a particular automobile. Further analysis of motives is attempted by questions concerning particular pieces of equipment, accessories, tires, and so on.

Of secondary though indisputable importance are the questions which attempt to learn the type of advertising that pulls with greatest power among prospective buyers.

The owner is asked the name of the make of car he owns, the body style, its age and the number of persons who drive and the average annual mileage. Getting down to serious business, the questionnaire then asks what factor will influence future purchases most and names comfort, ease of control, smoothness, appearance, speed, dependability, pick-up, low price and operating economy. It then asks the owner to name the most annoying maintenance item among a large group.

Looking into the future, the questionnaire asks the owner to indicate whether he considers possible improvements to be essential or undesirable or without great importance and gives these improvements as ride regulators, oversize balloon tires, safety glass, automatic choke, radiator shutters, synchromesh transmission, free wheeling, automatic clutch and automatic starter. Further, it asks if the owner himself can suggest improvements.

The advertising angle is covered by questions asking what recent automobile ad has impressed most, whose ads are most convincing, whether present ads give all the information that is desired and what advertiser, outside the automobile field is doing the most effective advertising.

A great part of the questionnaire is so arranged as to be answered by merely checking, but ample space is provided where this is impossible or where the owner might wish to elaborate in his answers.

The questionnaires are sent out in duplicate, one to be kept by the owner as a permanent reminder of General Motors, and the other, when filled out, to be returned to H. G. Weaver, 3044 W. Grand Boulevard, Detroit.

New Truck Law Effective in Miss.

A new Mississippi law fixing regulations for the height, length, width and capacity of trucks, buses and trailers became effective Aug. 1. It is a companion measure to the one which increases the tax on trucks and buses. Vehicles must not be over 8 ft. wide or 12½ ft. high including the load. 33 ft. is the maximum length and may not run over 50 ft., including the trailer. No single vehicle can carry more than seven tons, nor weigh more than four tons unloaded.

Borg-Warner Nets 26 Cents a Share

CHICAGO, Aug. 3—A net profit of $431,127 after charges is reported by Borg-Warner Corp. and constituent companies for the six months ended June 30, 1932. This is equivalent, after preferred dividends of constituent companies and of Borg-Warner Corp., to 26 cents a share on the 1,151,244 shares of common stock. This compares with earnings of $1,077,130 or 77 cents a share on 1,216,784 common shares in the first six months of 1931.

Profit for the quarter ended June 30 this year was $263,405 after taxes and charges. In the second quarter of 1931 the company earned $755,053.

Current assets as of June 30, 1932, amounted to $14,922,021 of which $7-268,590 was in cash and marketable securities.

Western Names Morgan

Fred L. Morgan, for 17 years with the Goodyear Tire and Rubber Co., has resigned from that organization to take over the sales managership of the Western Auto Supply Co. at Kansas City, Mo.

Losses for Federal for First 6 Months

DETROIT, Aug. 3—Net loss of $298,-638 after depreciation, interest, etc., is reported by Federal Motor Truck Co. for the six months ending July 30, 1932. This compares with a loss of $36,116 for the same period in 1931.

Nathan A. Wise

PONTIAC, Aug. 1—Nathan A Wise, 45 years old, special equipment engineer for General Motors Truck Co., died at his home here Thursday following an illness of six weeks.

Motor Makers Swell Detroit Tax Total

DETROIT, Aug. 1—A total of $3,358,-584 was received by the city of Detroit on July 30 on the first half payments on city taxes. It was expected that the amount would swell to above $5,-000,000 with the prospect of unopened mail containing checks and cash.

Of the amount received, General Motors Corp. paid a total of $1,361,-715, of which it previously had loaned the city $800,000.

Packard Motor Car Co. sent its check for $500,000.

Sterling Completes Republic Changes

LaFrance-Republic Name to be Continued. Work is Moved to Milwaukee

Further plans regarding the operation of the LaFrance-Republic Sales Corp., recently acquired by the Sterling Motor Truck Co., Milwaukee, have been announced by Sterling officials. The sales corporation will continue to function under the same name, but with the following officials: E. M. Sternberg, president; H. C. Keenan, vice-president; W. G. Sternberg, vice-president; Oscar E. Held, secretary, and R. W. Stork, treasurer. All of the above are officials of Sterling except Mr. Stork, who was treasurer of the LaFrance-Republic Sales Corp. prior to acquisition.

The entire operations of the former LaFrance-Republic company have been moved to Milwaukee from Alma, Mich, including the executive offices and production material. The accounting and repair parts departments are being retained at the Alma plant, but it is expected that they will eventually be transferred to Milwaukee. The first Republic trucks to be built by Sterling are scheduled to roll off the assembly floor early in August.

It is further announced that Earl L. Reichard has been retained as export manager of Republic trucks, with offices already located at the Sterling plant. Republic enjoys a broad foreign distribution and it is intended to hold the foreign sales organization intact. It is also reported that nearly all the former leading Republic distributors are entertaining a new dual franchise offered them which permits the handling of Sterling heavy-duty trucks in addition to Republics, which constitute a strong line of light and medium capacity trucks.

Travel by Air Is on Increase

American Transports Carry 33 Per Cent More Than Last Year

Scheduled American air transport planes flew over a total of nearly 50,000 miles of airways in 1931 and carried 18.6 per cent more passengers than in 1930, according to the Aeronautical Chamber of Commerce.

Regular air services of European operators, the Department of Commerce reports, in 1931 totaled 82,222 miles in length. This total included 10,532 miles of services operated by companies of two or more nationalities acting in cooperation or under pool arrangements.

The American transport lines, the Chamber reports, carried 487,910 passengers in 1931 as compared with 385,910 in 1930. Reports for the first five months of 1932 show that air travel on these American lines is 32.3 per cent greater than during the same period of the previous peak year, 1931.

Class C Records to Continental-DeVaux

With an average of 65.9394 m.p.h. for 1000 miles, Clint DuBois, in a stock Continental DeVaux coupe, broke the former record of 61.498 m.p.h. for Class C stock cars (183 to 305 cu. in.) at Muroc Lake, Calif.

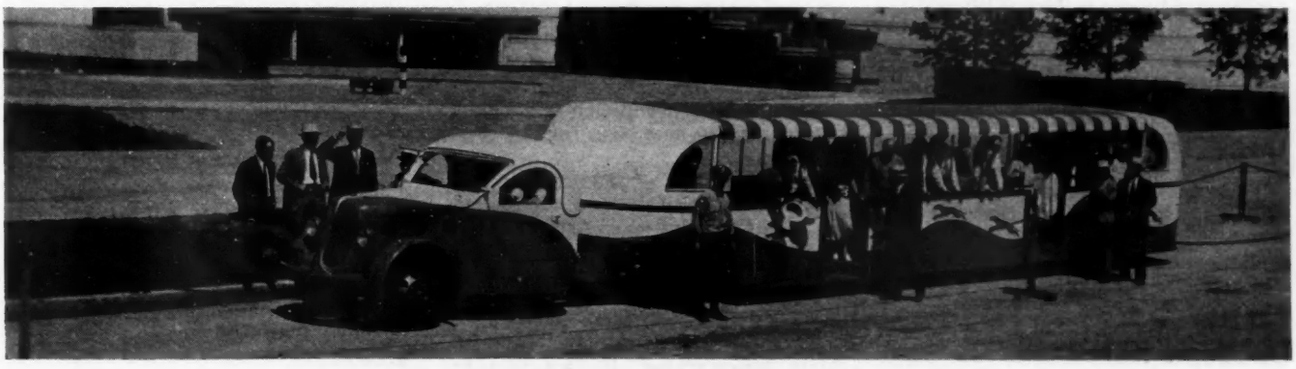
In addition, 21 other records ranging from 1 km. to 1000 miles were established by the same car, which is powered with a 214.7 cu. in. engine.

The tests were run in July during extremely hot weather, the temperature ranging from 80 deg. to 115 deg. at noon and were made under A.A.A. sanction and supervision. The list of records follows:

Distance	M.P.H.	Former Record	Former Holder
Standing 1 kilo.	50.326	Open	.....
Standing 1 mile	55.376	Open	.....
Flying 1 kilo...	69.6503	Open	.....
Flying 1 mile..	67.7112	Open	.....
Flying 1 mile sec. gear	51.663	Open	.....
Flying 5 kilo...	68.6934	Open	.....
5 miles	69.8423	68.752	Stutz
10 miles	66.5835	60.140	Stude. Dict.
25 miles	66.9035	Open	.....
50 miles	66.9545	61.492	Stude. Dict.
1 hour	65.7554	61,656	Stude. Dict.
75 miles	62.8622	Open	.....
100 miles	63.8488	61.831	Stude. Dict.
3 hours	63.6387	61.582	Stude. Dict.
200 miles	63.8525	Open	.....
250 miles	63,7793	Open	.....
300 miles	64.0804	Open	.....
6 hours	64.7418	61.458	Stude. Dict.
400 miles	64.8512	Open	.....
500 miles	64.9655	61.685	Stude. Dict.
12 hours	65.5774	61.989	Stude. Dict.
1000 miles	65.9394	61.498	Stude. Dict.

These records are subject to further confirmation by the A.A.A.

"On the Right, We See . . . ."



Modernistic blue and silver semi-trailer type buses now carrying visitors to see the sights on the grounds of Chicago's 1933 World's Fair—A Century of Progress Exposition. Two of these buses were put into operation recently by the Greyhound Corporation. Eventually there will be a fleet of 60 of these unique buses comprising the World's Fair intra-fair transportation system.

The buses are of unique design and were built especially for A Century of Progress service by the General Motors Truck Company. They are 45 ft. long and contain two longitudinal seats arranged back to back so that all 90 passengers face outward. They are open with a roof overhead and curtains for use in inclement weather.

June Vehicle Production in U. S. 183,092; Canadian Output 7,112 Units

June factory sales of automobiles manufactured in the United States (including foreign assemblies from parts made in the United States and reported as complete units or vehicles), based on data reported to the Bureau of Census, consisted of 183,092 vehicles, of which 160,103 were passenger cars, 22,754 trucks, and 235 taxicabs, as compared with 184,284 vehicles in May, 250,640 vehicles in June, 1931, and 334,506 vehicles in June, 1930.

The table below is based on figures received from 144 manufacturers in the United States for recent months 42 making passenger cars and 113 making trucks (11 making both passenger cars and trucks). Figures for passenger cars include only those designed as pleasure vehicles, while the taxicabs reported are those built specifically for that purpose. Figures for trucks include ambulances, funeral cars, fire apparatus, street sweepers, and buses. Canadian figures are supplied by the Dominion Bureau of Statistics.

NUMBER OF VEHICLES

	United States				Canada		
	Total	Passenger Cars	Trucks	Taxicabs†	Total	Passenger Cars	Trucks
1930							
June	334,506	285,473	48,570	463	15,090	12,194	2,896
1931							
June	250,640	210,036	40,244	360	6,835	5,583	1,252
1932							
January	119,344	98,706	20,541	97	3,731	3,112	619
February	117,418	94,085	23,308	25	5,477	4,494	983
March	118,959	99,325	19,560	74	8,318	6,604	1,714
April	148,326	120,906	27,389	31	6,810	5,660	1,150
May	*184,284	157,683	*26,528	73	8,221	7,269	952
June	183,092	160,103	22,754	235	7,112	6,308	804
Total 6 Months (Jan.-June)							
1930	7,198,580	1,860,361	333,591	4,628	110,685	93,359	17,326
1931	1,572,935	1,315,952	254,167	2,816	66,092	52,811	13,281
1932	871,423	730,808	140,080	535	39,669	33,447	6,222

* Revised
† Includes only factory-built taxicabs and not private passenger cars converted into vehicles for hire.

United Chromium is Upheld on Patents

The United States Court of Appeals of the Second District of New York has upheld the decision of the lower court in the case of United Chromium, Inc., against the International Silver Co. for alleged infringement of the Fink patent for the chromium plating of metals.

One exception is made to the dicision of the lower court, that referring to claim 16, which "requires that the bath shall be analyzed after the ingredients have been put in. The defendant's process, as agreed upon by stipulation, is not that; it puts in the proper proportions of chromium and sulphate radical at the start.

"The difference is not important, but the claim is clearly to cover practice in which commercial chromic acid alone is first used in the solution and the proper ratio established later."

The court holds that all of the other claims are infringed, and that the decree of the lower court was right except to claim 16.

Timken Cuts Dividend Rate

CANTON, OHIO, Aug. 4—Timken Roller Bearing Co. has reduced its annual dividend basis to $1 from $1.50 by declaring a quarterly dividend disbursement of 25 cents a share payable Sept. 6 to stock of record Aug. 19.

For the first six months of 1932, this company showed a net profit after depreciation, taxes and other charges of $417,520, equivalent to 17 cents a share on 2,411,638 shares. Profit for the first half of 1931 was $2,462,714 or $1.02 a share.

Profit for the quarter ending June 30, 1932, was $199,903 and for the same quarter last year was $1,148,075.

Steel Prices Are Steady This Week

Consumption by Motor Industry Important Even in Depressions

NEW YORK, Aug. 4—For each thousand tons of steel produced during the first half of this year, 119 automotive units were turned out, official figures of automobile production and ingot output serving as a basis for this computation.

In the first half of 1931, 104 passenger cars and trucks were turned out for each thousand tons of steel; in the first half of 1930, 97; in the first half of 1929, 116; in the first half of 1928, 93; in the first half of 1927, 92, and in the first half of 1926, 103.

While automotive demand is temporarily tapering off, it continues to serve as a stop-gap, the expected heavier demand from other sources, such as the railroads and the construction industry, being rather tardy in making itself felt. Specifications for sheets and other descriptions of finished steel for 1933 models are looked for to gradually make their appearance later this month.

Prices are holding steady all along the line, with a revision of forging bar extras denoting a slight advance in prices to most consumers.

Pig Iron—Seasonal quiet is noted in all the markets. Prices are unchanged and more or less nominal.

Aluminum—Demand is very light. Prices unchanged.

Copper—Wall Street hears that the copper market is being groomed for an advance to 7 cents, this in spite of the heavy tonnages of metal that await disposal in the hands of custom smelters and others. These, so the Wall Street rumor has it, will be cleaned up by strong hands. One inquiry, deliveries to be spread over the entire next year, was in the market, and some consumers are negotiating for first quarter 1933 deliveries on the 5.25 cent price basis which continues in effect.

Tin—Quiet and firm at 21½ cents for Straits tin.

Lead—The market has turned firm with the leading interest having advanced its contract-basing price to 2.95 cents, New York.

Zinc—Consuming demand has improved and the market advanced several points.

Studebaker Net Loss is $1,917,015 for Quarter

Compares With $484,125 For First Three Months

SOUTH BEND, IND., Aug. 3—Report of Studebaker Corp. and subsidiaries, including Pierce-Arrow Motor Car Co., for quarter ended June 30, 1932, shows consolidated net loss of $1,917,015 after depreciation, interest, taxes and dividends on Pierce-Arrow preferred stock, etc.

This compares with net loss of $484,125 in preceding quarter, and net profit of $1,219,605, equal, after Studebaker Corp. preferred dividends, to 56 cents a share on 1,961,413 no par shares of common stock, including 56,368 shares in treasury in June quarter of previous year.

For six months ended June 30, 1932, consolidated net loss was $2,401,140 after taxes, charges and Pierce-Arrow preferred dividends.

This compares with net profit of $2,029,355, equal to 91 cents a share on common in first half of 1931.

Studebaker Corp. has declared the regular quarterly dividend of $1.75 on the preferred stock, payable Sept. 1 to stock of record Aug. 10.

Stockholders OK New Brockway Plan

CORTLAND, N. Y., Aug. 4—Brockway Motor Co., Inc., a new operating company, will be formed to take over all current operations of the Brockway Motor Truck Corp. under the financial reorganization plan approved by more than two-thirds of the stockholders.

The new company will acquire all operating assets of the old corporation, will assume all current debts and contingent liabilities and will assume contractual and policy obligations to customers. R. F. Black, president, states that there will be uninterrupted service to Brockway users and prospective customers in both production and sales.

Steam Air Engines Soon, Ford Thinks

Urges Factory-Farm Tieup in Birthday Statement; Sees Much Less Drinking

". . . mass production should be combined with agriculture"

Sixty-nine years old on July 30, Henry Ford this year followed the practice common to himself and other celebrities of making a birthday statement for the newspapers on various topics of interest to him and to them. Almost coincident with his birthday reaffirmation of belief in the need for practical combination of agriculture and manufacturing came release of a signed article by Mr. Ford in *Collier's* giving his views on the prohibition question.

"I believe that steam engines will be adapted to airplanes in the not distant future," he said in the birthday statement quoted by the Detroit *News*, and went on to add:

"The problem of airplane motors is one of weight, power and fuel—and simplicity of construction. That problem will be solved, but it may take 10 years to do it."

In the *Collier's* article he reiterated his belief in the efficacy of the prohibition amendment, elaborating on his reasons for those beliefs. Indicative of the article as a whole is the paragraph which follows Mr. Ford's statement that the first actual consequence of prohibition "is the decrease in drinking":

"I have sometimes read," he writes in this article, "that drinking has not decreased; I have even read that drinking has increased since prohibition came. To argue either of these statements is like debating the sum of two twice two. I know from daily observation for over 40 years there is not 1 per cent of the drinking done in the United States that was done formerly. There is not as much drinking today as there was two years ago, since many of our so-called 'better class' have begun to see themselves as they are. Anyone 30 years of age knows this from his own observation. It does not have to be argued."

Losses for P-A

Pierce-Arrow Motor Car Co. and subsidiaries showed net loss of $878,800 for the quarter ending June 30 and loss of $1,072,334 for the six months ending on the same date.

This compares with a profit of $115,262 in the second quarter of 1931 and a profit of $421,711 for the first half of 1931.

Mack Truck Losses

Mack Trucks, Inc., reports for the quarter ended June 30, 1932, net loss of $203,872 after depreciation, comparing with a net loss of $313,071 for the preceding quarter, and a net profit of $127,411 for the quarter ended June 30, 1931.

The net loss for the six months ended June 30, 1932, was $516,943 after taxes and charges, comparing with a net loss of $51,326 for the corresponding six months of 1931.

Cummins Diesel Co. Expands Plant Size

COLUMBUS, IND., Aug. 5—Work has started on construction of a new factory building which will add 20,000 sq. ft. to the plant of the Cummins Engine Co. here. It will increase production facilities for the new Diesel oil-burning truck engine recently introduced by Clessie Cummins, its inventor and president of the firm.

The new plant will generate its own electricity with the use of a 500 hp. Diesel motor. Twenty engines a day will be made beginning Oct. 1.

New Body Orders Are Spurring Mengel

HICKMAN, KY., Aug. 3—The Mengel Co. plant here, one of the largest veneer plants in the world, has started operations after being shut down for several weeks and put several hundred people to work.

The plant has received a large rush order for plywood boxboards for automobile bodies.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, Aug. 4—There was no actual improvement in trade last week. Wholesale and jobbing lines were dull, and the best showing was made in retail lines. The heavy industries were slow. However, in most quarters there appears to be unmistakable signs of improving sentiment. It is regarded that the continued demand for bonds at rising prices is one of the most encouraging features of the current outlook.

GOTHAM TRADE

Wholesale business in the New York Federal Reserve district during June was 26 per cent below that a year ago. Chain store sales in that district were about 12½ per cent below.

Sales of department stores in the metropolitan area of New York from July 1 to July 18 were 23.9 per cent below those in the corresponding period last year.

COTTON SPINNING RESUMES

There were 31,705,038 cotton spinning spindles in place in the United States on June 30, of which 20,561,914 were operated at some time during the month, as against 21,639,352 during the preceding month and 25,898,026 a year ago.

CRUDE OIL PRODUCTION

Average daily crude oil production for the week ended July 23 amounted to 2,205,850 barrels, as against 2,154,850 barrels for the preceding week and 2,486,950 barrels a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended July 30 stood at 60.9, marking the sixth successive week for which a decrease was not reported. The index number for the preceding week was 60.8.

BANK DEBITS

Bank debits to individual accounts outside of New York City during the week ended July 27 were 29 per cent below those a year ago.

STOCKS RISE

The upward tendency of the stock market was not only maintained last week, but the rise in prices was the most substantial for many weeks. The rise continued from day to day without interruption. The volume of trading increased rapidly as prices improved. The railway issues shared in the advance. Obviously, sentiment has changed for the better. The upward movement of stock prices during the last few weeks is attributed mainly to the strength in the bond market and the increase in commodity prices.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended July 27 showed decreases of $13,000,000 in holdings of discounted bills and of $12,000,000 in holdings of bills bought in the open market. Holdings of Government securities increased $5,000,000. The reserve ratio on July 27 was 56.5 per cent, as against 56.2 per cent a week earlier and 56.3 per cent two weeks earlier.

Exports, Imports and Reimports of the Automotive Industry For June and Six Months Ended June, 1932-1931

	Month of June				Six Months Ended June			
	1932		1931		1932		1931	
	Number	Value	Number	Value	Number	Value	Number	Value
Automobiles, parts and accessories	....	$6,332,372	.....	$12,911,118	....	$45,657,100	.....	$94,665,270
Motor trucks, buses and chassis (total)	1,387	664,424	4,340	2,539,768	12,333	5,800,172	29,168	15,740,018
Under one ton	142	41,141	472	155,847	1,346	353,247	4,791	1,704,363
One and up to 1½ tons	1,036	415,886	3,362	1,472,915	9,379	3,712,587	20,872	9,442,570
Over 1½ tons to 2½ tons	136	105,276	305	563,331	1,088	882,834	2,325	2,695,503
Over 2½ tons	63	96,128	154	298,479	431	736,121	933	1,722,220
PASSENGER CARS								
Passenger cars and chassis	....	.....	.....	.....	....	.....	.....	.....
Low price range, $850 inclusive	2,499	1,295,247	4,637	2,419,609	21,966	10,534,837	43,343	20,806,259
Medium price range over $850 to $1,200..	272	250,529	704	674,320	2,451	2,353,466	7,266	6,958,551
$1,200 to $2,000	96	123,257	242	336,366	899	1,182,168	1,918	2,767,859
Over $2,000	55	138,510	99	267,013	473	1,235,622	1,025	2,615,613
PARTS, ETC.								
Parts except engines and tires	....	.....	.....	.....	....	.....	.....	.....
Automobile unit assemblies	....	1,910,751	.....	3,540,477	....	13,168,168	.....	25,715,406
Automobile parts for replacement (n.e.s.)....	....	1,303,839	.....	2,466,706	....	6,950,642	.....	14,736,187
Automobile accessories	....	144,314	.....	292,769	....	1,069,048	.....	2,052,492
Automobile service appliances (n.e.s.)	....	92,772	.....	647,969	....	947,942	.....	2,263,839
Trailers	35	4,622	27	18,064	109	58,454	491	159,211
Airplanes, seaplanes, and other aircraft	5	19,757	21	324,851	61	597,959	68	911,141
Parts of airplanes, except engines and tires..	....	100,335	.....	178,264	....	646,860	.....	983,033
BICYCLES, ETC.								
Bicycles	109	2,603	188	4,879	506	12,256	962	24,955
Motorcycles	98	22,127	272	66,212	1,316	293,666	3,843	938,657
Parts and accessories, except tires	....	29,320	.....	46,216	....	186,960	.....	330,324
INTERNAL COMBUSTION ENGINES Stationary and Portable								
Diesel and Semi-Diesel	3	12,000	17	53,459	23	121,312	163	206,980
Other stationary and portable:								
Not over 10 hp.	369	24,371	657	51,632	2,154	143,437	4,856	378,564
Over 10 hp.	101	23,003	670	356,676	375	209,212	3,281	1,567,309
Automobile engines for:								
Motor trucks and buses	242	32,020	72	21,629	1,457	219,066	3,984	597,403
Passenger cars	2,017	136,469	1,406	112,639	14,882	1,183,015	12,888	1,079,845
Tractors	....	.....	1	100	9	3,603	8	16,376
Aircraft	499	78,950	32	211,059	630	390,860	145	763,476
Accessories and parts (carburetors)	....	113,280	.....	185,310	....	681,836	.....	1,222,053
IMPORTS								
Automobile and chassis (dutiable).....	42	10,351	68	44,056	223	145,724	317	383,235
Other vehicles and parts for them (dutiable).	....	4,385	.....	3,778	....	24,919	.....	29,218
REIMPORTS								
Automobile (free from duty)	26	25,360	11	5,867	80	83,224	85	73,627

Indian Cuts 1st Quarter Losses

SPRINGFIELD, MASS., Aug. 1—Indian Motocycle Co. and subsidiaries report for the second quarter, ended June 30, net loss after depreciation and all other charges of $3,098 compared with net profit of $30,205 in the same period last year. Net loss of $40,882 after depreciation was shown for the first quarter of this year.

For the six months ended June 30, there was a net loss, after all charges, of $43,981, compared with net loss of $28,424 for the first half of 1931. Sales of Indian motorcycles and allied products for the second quarter this year were $304,512 and for the six months $619,666 against $642,674 and $1,063,755 respectively last year.

The company notes a perceptible feeling of improvement in general business throughout the country, according to E. Paul du Pont, president.

American Felt Has Two Cutting Shops

American Felt Co., important manufacturer of automotive felts, now has two separate and complete cutting shops, one in Detroit and one at its Glenville mill which serves the New York metropolitan area.

The Glenville mill, which is one of five mills owned by this company, manufactures 75 per cent of the automotive felts, officials of the company state, and is specially adapted to turning out all kinds of mechanical parts.

More Consumer Credit Needed

Hanch Flays Congress Inaction in Move on Finance Company Paper

CHICAGO, Aug. 5—Millions of persons entitled to credit—business men, wage and salary earners, who are hit by the depression—are being denied credit accommodations or are obtaining them only with great difficulty, according to C. C. Hanch, general manager of the National Association of Finance Companies, who today pointed out that the nation's buying power was being lashed to the mast of the good ship "Stagnation" by the failure to provide ample means of granting consumer credit.

"The finance companies, which started in the business of purchasing instalment plan automobile paper, and which have widened their scope of operations to meet a genuine business demand, are in a position to say definitely that the buying power of the nation is being restricted by the failure of Congress to make proper provision for consumer credit," said Mr. Hanch. "A move which would have done this was started by Senator Sheppard of Texas, who introduced a bill to make finance company paper eligible to rediscount at the Federal Reserve Banks, but Congress adjourned before it was acted upon.

"The demand for aid in financing comes from persons who want to purchase household equipment, pay insurance premiums, keep their old cars in repair, or purchase new automobiles, and from business men who need to buy new machinery and equipment for productive purposes. Men are prevented from starting in business by the lack of capital to buy equipment. The finance companies are meeting this problem to the best of their ability, but they are compelled to pay a premium for the money they borrow from banks, because of an antiquated law which prevents the rediscounting of their paper.

"Restoration of buying power rests largely on the extension of consumer credit and manufacturers cannot operate without consumer buying power."

Thompson Products Shows Net Loss

CLEVELAND, Aug. 3—Thompson Products, Inc., and subsidiaries reported that for six months ended June 30 its net loss, after taxes, interest, depreciation and other charges, was $13,251, contrasted with net profit of $138,254, equal after preferred requirements to 48 cents a share on 263,160 no par common shares, for first half of 1931.

For the quarter ended June 30, net loss, after above deductions, was $19,301, contrasted with net profit of $6,050, equal to $1.63 a share on 3715 7 per cent preferred shares, in preceding quarter and $103,196 income, equivalent, after preferred dividends, to 37 cents a common share, for second quarter a year ago.

Libbey-Owens-Ford Betters 6 Mo. Net

TOLEDO, Aug. 1 — Libbey-Owens-Ford Glass Co. reports net profit of $3,899 after taxes, depreciation, interest, etc., for the quarter ended June 30, 1932, compared with profit of $15,980 in the same quarter of 1931.

For six months ending June 30, 1932, net profit was $48,130 after charges, which equals 2 cents a share, as compared with a net loss of $172,092 for the first half of 1931.

Loss Replaces Foundry Profit

Campbell, Wyant & Cannon Foundry Co. and subsidiaries have reported a net loss of $140,443, after charges, for six months ending June 30, 1932. This compares with a net profit of $296,000, equal to 85 cents a share, for the first six months of 1931.

For the quarter ended June 30, 1932, the net loss was $117,064, as compared with a profit of $155,800, or 45 cents a share, in the second quarter last year.

Stewart-Warner Shows Smaller Net Losses

CHICAGO, Aug. 3—Stewart-Warner Corp. reported for the quarter ended June 30, net loss after depreciation, taxes and other charges of $487,173, against $536,760 deficit in preceding quarter and net profit of $110,937, equal to 8 cents a share on 1,295,882 capital shares, in second quarter last year.

Six months ended June 30, net loss after above charges, $1,023,933, against $220,819 deficit in first half of 1931.

L. A. Young Reports Income

NEW YORK, Aug. 3—L. A. Young Spring and Wire Co. and subsidiaries for six months ended June 30 reported net income after depreciation, Federal taxes and other charges, $61,455, equal to 15 cents a share on 388,198 shares, excluding 24,302 shares in treasury, against $609,210, or $1.57 a share for corresponding six months of 1931.

For the quarter ended June 30, net income after above deductions, $55,682, or 14 cents a share, against $5,773, or 1 cent a share in first quarter of current year and $376,130, or 97 cents a share for the second quarter last year.

French Firms Profit

PARIS, July 20—Financial report of the Mathis Automobile Co. shows a net profit for the year ending Dec. 31, 1931, amounting to 11,528,016 francs, compared with 27,318,034 francs in 1930. Of the net profit, 4,500,000 francs will be distributed in dividends, and the remainder will be devoted to amortization and surplus.

The financial statement of the Hotchkiss Co. shows a net profit for 1931 of 12,198,459 francs, of which 9,600,000 francs were distributed as dividend and the remainder carried to the reserve fund.

Bendix Shows First Half Loss

CHICAGO, Aug. 1—Bendix Aviation Corp. reports a net loss, after charges, of $52,126 for the six months ending June 30, 1932, as compared with a net profit, including $221,000 non-recurring profit, of $1,512,345 for the first half of 1931. Earnings per share in the first half of last year were 72 cents.

For the quarter ended June 30 this year net loss was $78,490, compared with a profit of $713,688 in the second quarter of 1931.

Canadian McCord Increases Operations

WALKERVILLE, ONT., Aug. 3—McCord Radiator & Mfg. Co. have notified their employees that increased operations are now in effect.

This is the result of a contract to supply Ford Motor Co. of Canada with their 8-cylinder radiator requirements. The same McCord tubular type of radiator as supplied to the Ford River Rouge Plant will be used in the Canadian production.

Established in 1910, the present McCord plant is one of the most modern in the Border Cities automotive district.

Both McCord tubular and cellular type radiators are built in this plant and used by the leading Canadian manufacturers of passenger cars, buses and trucks.

Autolite Reports $1,088,514 Profit

Six Months Report Gratifying, Miniger Says; Operations at 15%

TOLEDO, OHIO—Electric Auto-Lite Co. net profits for the first six months of 1932, including subsidiaries, were $1,088,514.29, equal to $1.08 per share on common stock after provision for preferred dividends.

Operations and other income resulted in gross income of $2,158,135.26, after depreciation. Deductions for selling, administrative and general expenses, and all other charges, including Federal taxes, were $1,059,620.97.

Second quarter earnings were equal to 55 cents per share on the common, compared with 53 cents during the first quarter. The common now is on an annual basis of $1.20 per share.

"It is gratifying to the management," stated C. O. Miniger, president, "that these results were obtained with the company's plants operating at about 15 per cent of capacity during the period.

"It shows that many economies were put into effect that substantially reduced our operating expenses."

Kelly-Springfield Reports Profit

Kelly-Springfield Tire Co., for six months ended June 30, showed a net profit after taxes, depreciation, interest and other charges, of $57,101, against net loss of $281,436 for corresponding six months of previous year.

The readjustment committee has declared operative as of July 28 the capital readjustment plan of Kelly-Springfield Tire Co. on the basis of deposits of more than two-thirds of all classes of stock. Further deposits of stock will be received until Aug. 22. No new money was required or sought in the recapitalization.

Franklin Sales Up

SYRACUSE, N. Y., Aug. 2 — The Franklin Automobile Company records a decided mid-summer pickup in business, according to officials of the company, who state that unfilled orders now on hand exceed the same period of last month by 130 per cent.

Lycoming Improves

WILLIAMSPORT, PA., Aug. 1—Foundry pourings of the Lycoming Manufacturing Co. during the month of June were 109.2 per cent greater than in May, and 8 per cent greater than the combined pourings for April and May, 1932, W. H. Beal, president, announced today.

Floral City Rubber Plant to Resume

FOSTORIA, OHIO, Aug. 3—Machinery of the Floral City Rubber Co. is being installed in a plant here formerly occupied by the Seneca Motor Co. The company is moving from Jackson, Mich.

Harris Supplies Sound Deadener

WOOSTER, OHIO, Aug. 2—The J. E. Harris Co., paint manufacturer, will supply all sound-deadening coating for use on the new model of the Essex Terraplane car, according to an announcement here.

Steenstrup Back for New B-O-P Duties

Peter S. Steenstrup, on July 1 appointed assistant regional manager of the Eastern region, B-O-P Sales Co., has returned to this country after two years' service abroad as managing director of the General Motors plant in Sweden. He believes that Sweden will recuperate rapidly from the economic ills under which it is suffering.

Bond Committee for Durant of N. J.

NEW YORK, Aug. 1—A protective committee consisting of active officers of S. W. Straus & Co., Inc., has been formed for holders of first mortgage 6½ bonds of Durant Motor Co. of N. J. Deposit of bonds which mature in 1934 is being requested. Principal and interest due on these bonds July 15, 1932, were not paid on that date.

Durant Sale on Sept. 9

LANSING, July 28—Sept. 9 was set as the date for sale of the Lansing factory of the Durant Motor Co. of Michigan in an order signed in Federal District Court at Detroit by Judge E. J. Moinet, according to reports received here through Byron Ballard of Shields, Silsby, Ballard & Jennings, counsel for the Central Trust Co. of Lansing, receiver. The sale will be made at the plants with the receiver in charge. Formal bids, it is understood, are being asked for immediately.

New Charge Levied on Crane Loading

WASHINGTON, Aug. 4—Unloading and loading of freight by use of cranes in Official Classification territory, except New England territory, hereafter will cost shippers 50 cents per net ton, with a minimum of $5 per shipment. This proposed charge of the carriers was held justified by the Interstate Commerce Commission in a decision made public last Friday.

At the same time it held as not justified proposals of the Pennsylvania Railroad to give free crane service at stations with permanent cranes.

Sheffield Head Dies

DAYTON, OHIO, Aug. 1—Charles E. Watterson, 61, president of the Sheffield Machine Tool Co., died from a heart attack in July at his home, 700 Oakwood Ave. He was a member of the Society of Automotive Engineers, the Toledo Athletic Club, the Century Club of Muskegon, Mich., and the Screw Threads Commission connected with the U. S. Bureau of Standards.

Welders Meet Oct. 3

The American Welding Society will hold its twelfth fall meeting at Buffalo, N. Y., Oct. 3-7, in connection with the 14th National Metals Exposition. Morning technical sessions and committee meetings will be held at the Hotel Statler, afternoon sessions in the 174th Regiment Armory.

Caminez Goes Abroad

Harold Caminez, in charge of aircraft design, Allison Engineering Co., left last week for Europe, where he will investigate present design tendencies in European aviation engines and at the same time enjoy a vacation.

Edwards to Trenton

Eaton G. Edwards has joined the Trenton Auto Radiator Works, Trenton, N. J., as equipment sales engineer. He spent a number of years with G. & O. Manufacturing Co. in a similar capacity.

Business Blooms for Bee-Line

DAVENPORT, IOWA, Aug. 5—Geo. L. Hunt Automotive Equipment Co., makers of Bee-Line wheel, axle and frame aligning equipment, reports orders to be increasing daily and increased production schedules planned for the rest of 1932. This company recently moved into its new plant just north of here.

Ingersoll's Plans

George B. Ingersoll, who recently resigned as chief engineer of the Federal Motor Truck Co., will in the future devote all of his time to a patent and trade mark practice. He has opened an office at 1420 David Scott Bldg., Detroit.

Dardelet Licenses Chandler

CLEVELAND, Aug. 2—Chandler Products Co. has been licensed by the Dardelet Threadlock Corp. to manufacture and sell bolts and nuts and screws, with the Dardelet self-locking thread.

Illmer Opens Law Practice

CORTLAND, Aug. 3—Louis Illmer, who had charge of the Brewer-Titchenor Corp. patent department for the past ten years, has established a private patent practice and opened an office at 111 Port Watson Street, here. He will specialize in patents on automotive parts and accessories.

+ + CALENDAR OF COMING EVENTS + +

FOREIGN SHOWS

London, Olympia Show .....Oct. 13-22
Glasgow, Scottish Motor Show..Nov. 11-19
Paris, Aeronautical Show...Nov. 18-Dec. 4

CONVENTIONS

American Chemical Society, Denver, Colo. .....Aug. 22-26
S.A.E. Aircraft Meeting, Cleveland .....Aug. 30-Sept. 1
American Society Mechanical Engineers, Cleveland, Ohio (Machine shop practice meeting) .....Sept. 12-17
American Trade Association Executives, Atlantic City (Annual) .....Sept. 15-17
Penna. Automotive Assn., Harrisburg, Pa. .....Sept. 19-20
Natl. Assoc. of Motor Bus Operators, Chicago .....Sept. 22-23
American Electric Railway Assn., Chicago, Ill. .....Sept. 27-28
Amer. Institute Mining & Met. Engrs. (Petroleum Division), Dallas, Texas .....Sept. 30-Oct. 1
S.A.E. Production Meeting, Buffalo .....Oct. 3
Amer. Society for Steel Treating, Buffalo .....October 3
Amer. Institute Mining & Met. Engrs. (Iron & Steel Division), Buffalo, N. Y. .....Oct. 3-6
National Safety Council, Washington, D. C. .....Oct. 3-7
American Welding Society, Buffalo, N. Y. .....Oct. 3-7
American Society Mechanical Engineers, Buffalo, N. Y. (Natl. Iron and Steel Meeting).....Oct. 3-8
S. A. E. Annual Transportation Meeting, Toronto .....Oct. 4-6
American Gas Association, Atlantic City (Annual) .....Oct. 10-14
Natl. Hardware Assn. (Accessories Branch), Atlantic City, N. J. .....Oct. 17-22
Natl. Tire Dealers Assoc., Atlanta, Ga. .....Nov. 14-16
American Society Mechanical Engineers, New York City (Annual Meeting) .....Dec. 5-9
Natl. Exposition of Power & Mechanical Engineering, New York .....Dec. 5-10

RACES

National Air Races, Cleveland .....Aug. 27-Sept. 5
Altoona .....Sept. 5

Now

a GEAR-MEASURING MACHINE

. . . to enable you to CONTROL Gear Accuracy more closely

COMPLETE INSPECTION — Tooth shape, tooth spacing, eccentricity, diameter, and lead of helical gears, guides and other helically-splined members. To measurements of 0.0001 in. and less, quickly, easily, and accurately.

A Shop Tool, simple and rugged, yet capable of laboratory accuracy and duplication of measurements. . . .

Easily adapted from one operation to another, and easily understood by the average mechanic. . . . .

Provides Control over production by facilitating rapid and Complete Inspection. Will help to lower your production losses.

Our representative in your locality will welcome the opportunity to explain and demonstrate its advantages. Write:

A close-up showing the machine set for measuring involute profile. Quick changeover sets measuring units to inspect tooth profile in combination with lead, or other essential elements of spur and helical gears.

THE FELLOWS GEAR SHAPER CO.
78 River Street, Springfield, Vermont
616 Fisher Building, Detroit, Michigan

FELLOWS
GEAR SHAPERS

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

Fellows Gear-Measuring Machine

The Fellows Gear Shaper Co., Springfield, Vt., has placed on the market a gear-measuring machine which incorporates many interesting and unusual features. It comprises a substantial pedestal upon which is mounted a rotatable table. The work is held on a vertical work-arbor, and the fixture carrying the measuring instruments is located on top of the table. Its capacity is from 2 to 7 in. P.D.

The various elements of a gear tooth that can be checked on this machine are: Involute profile or shape, circular pitch, pitch diameter and eccentricity; also the lead or corresponding helix angle of helical gears, guides and other helically-splined members.

The column that carries the work can be adjusted to any desired height through gearing, and the vertical position of the column particularly when measuring leads is accomplished through the medium of thickness gage blocks. The work-holding adaptor can be aligned in the true vertical position and also at right angles to the table top by four screws that project from the pedestal. The fixture which carries the dial indicator and the various inspection units is so made that it can be moved about on the table when measuring involutes; fulcrumed to the table when inspecting circular pitch, lead, pitch diameter and eccentricity.

For inspecting involutes, as shown, a master involute gage is employed against which the involute of the gear tooth is compared. Contacting with this master involute gage, when the inspection test is being made, are angular guide bars forming the sides of two rack teeth, which control the position of the fixture as it is being moved about on the table, thus enabling the operator to compare the gear tooth with the master gage.

For checking the lead of helical gears, two methods can be employed: One by the use of offset or stepped master involutes, and the other by the so-called sine bar method. The stepped master involutes enable the involute of the tooth to be checked at two points at the same time that the lead is being inspected, and eliminate any computation on the part of the operator.

For checking circular pitch, a special unit carrying a fixed stop and spring is attached to the fixture. A ball pointer replaces the involute pointer, and the gear is indexed from one tooth to the next, and the variations in position of the indicator needle noted.

For checking pitch diameter and eccentricity, master gage disks are employed for setting the cone pointer to the correct radial position. A separate cone pointer is required for every pitch and pressure angle of the gear being measured.

Automatically Primed Centrifugal Pumping Unit

Announcement has just been made by Worthington Pump & Machinery Corp., Harrison, N. J., of a new self-contained automatically primed centrifugal pumping unit having many distinct advantages. It comprises an electrically-driven high efficiency ball-bearing centrifugal pump, mounted with its motor, on a fabricated steel bedplate, together with a monobloc priming unit of the wet vacuum type, controlled by an electric pressure switch. The priming pump, or evacuator, is an adaptation of the well-known "Hytor" pump, and is licensed to Worthington. under patents of the Nash Engineering Co.

Cincinnati Measuring Device for Boring

A precision measuring device applied to Cincinnati milling machines by the Cincinnati Milling Machine Co., is said to adapt the machine for jig boring and die sinking.

It is also useful for precision-boring small or moderate size lots where it is desirable to hold close limits on spacing between holes, within a very limited range. It is possible to finish-bore holes accurately spaced within one-half thousandth (0.0005) of an inch.

The complete equipment consists of one dial indicator, one micrometer head and a set of standard measuring rods for each movement; cross, longitudinal and vertical. The dials are covered and protected. Brackets and vee block hold the measuring rods and micrometer head, which are placed between the adjustable stop and dial indicator attached to the table and saddle (longitudinal movement).

Perfex Develops V-Water Heater

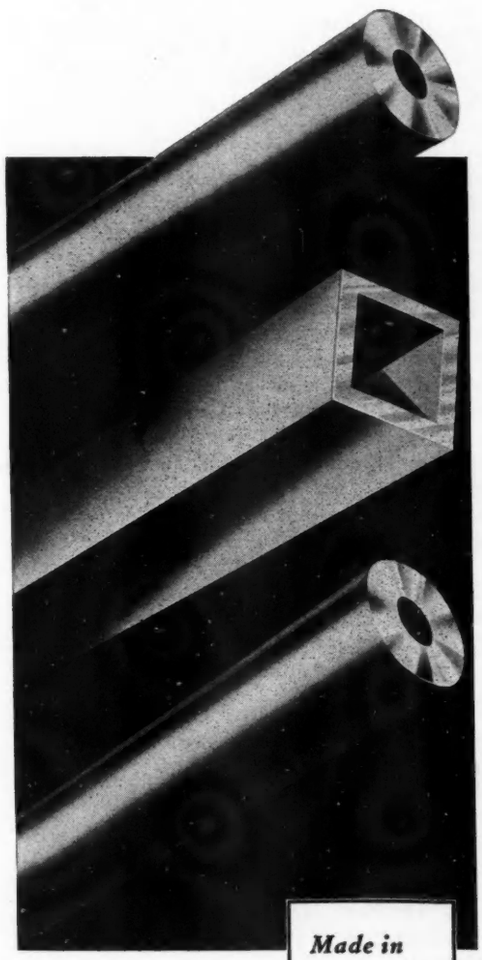
A new V-front model of hot water heater for all makes of cars has been announced by the Perfex Corp., Milwaukee, Wis.

It is said to be neater in appearance, having a polished chromium-plated front, and to have greater heating capacity than the model it supersedes. The fan is operated by a 6-volt 2500 r.p.m. motor drawing 1.5 amp. The heater is protected against vibration by a flexible mounting.

There are three rows of copper tubes arranged in a stagger. The core measures 6½ x 6½ x 2 13/16 in. in depth; tubes are of ⅛ x ¾ in. size, with 0.008 in. wall thickness. There are 44 tubes with 38 fins each, 0.005 in. thick.

The total heating surface is 1600 sq. in. With water entering the heater at 170 deg. Fahr. and air entering at 70 deg., the final air temperature is 122 deg. Fahr. and 125 B.t.u. are imparted to the air per minute, according to the manufacturer.

UNIFORMITY
of basic material is important in
PARTS MAKING



Made in Round, Square, Oval and Rectangular Shapes . . .

Uniformity throughout, to a very high degree, is necessary for safe and economical parts making; adequate manufacturing resources and unremitting vigilance over every operation must be devoted to maintaining it.

In the making of NATIONAL-SHELBY Seamless Tubing every factor is under a single control; and materials, processes, inspections and tests are employed without stint or compromise in order that uniformity may be secured. Not only a new measure of economy in production but a new measure of certainty in results is brought about when this uniform product is used in the making of automotive parts. It is adaptable to uses far more numerous and varied than might be supposed.

An informative handbook, "Seamless Tube Standards", will be mailed on request. Correspondence as to your special requirements is invited, and careful advice will be given concerning any intended use of NATIONAL-SHELBY—

America's Preferred Seamless Tubing

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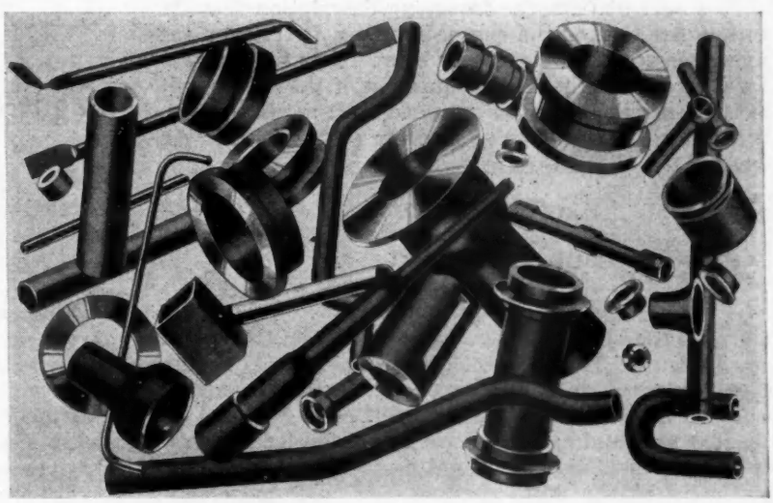


NATIONAL-SHELBY SEAMLESS TUBING

Flexible Engine Mounting of 1903

IN a recent publicity release of Plymouth Motor Corp., mention is made of the Phelps car as having had an engine mounting somewhat similar to the Chrysler floating power. Since flexible mountings are now in the limelight, it may be of interest to our readers to get some of the particulars of this early car, which was fully described and illustrated in the automobile publications of its time. The following particulars are taken from *The Horseless Age* of June 10, 1903:

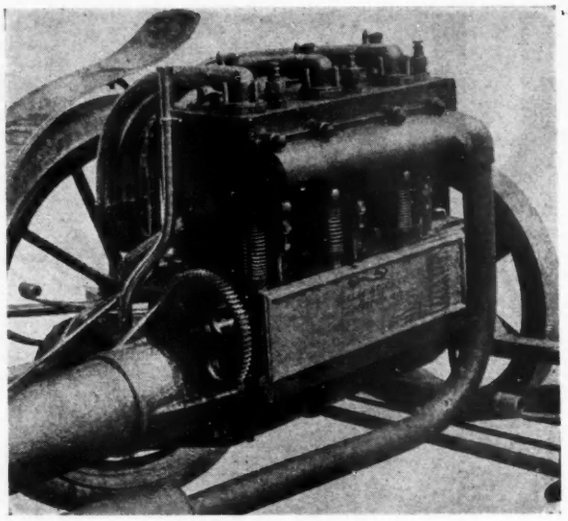
The car was developed by the Phelps Motor Vehicle Co. of Stoneham, Mass. It had a three-cylinder vertical engine located under a hood at the front. The crankcase was of the single-piece or barrel type. The flywheel was located at the forward end, forward of the front axle, the forward end of the engine being supported on the axle through the intermediary of a transverse semi-elliptic spring.

To the rear of the engine crankcase was fastened, by means of a flanged fitting, a large-diameter tube (about 6-in. diameter, to judge from the illustrations) which extended all the way to the center housing of the shaft-driven rear axle, to which it was rigidly connected. The transmission was enclosed in this housing.

According to our source, "the special feature of the car is that none of the driving machinery is attached to the body and that the occupants therefore do not feel the vibration of the engine." The body was supported on the axles by separate full elliptic springs, and by removing the spring bolts from the front springs the body could be raised in front so as to completely expose the engine and its accessories.

This car may be regarded as a forerunner of the present tubular backbone style of car of Austrian and Czechoslovakian manufacture, though it lacks independently sprung rear wheels and the backbone outriggers for body support.

It is evident from the foregoing description that the torque reaction of the engine is taken directly by the axles, most of it undoubtedly being taken by the rear axle, because of the rigid connection of the power unit to it. Since the body was mounted on separate springs, it had considerable angular freedom with respect to the engine.



The feature of the Phelps mounting was that "none of the driving machinery was attached to the body"

New Type of Transport

(Continued from page 165)

vided by the Empire Marketing Board and 21 overseas governments. The unit which is being shown at Aldershot consists of an eight-wheeled tractor and two eight-wheeled trailers. The tractor itself carries a load of about 3 tons and hauls the two eight-wheeled trailers, each carrying 6 tons, the total useful load thus being 15 tons. All the units are mounted on large-section pneumatic tires, and as no axle weight amounts to 2¾ tons when the unit is fully loaded, it is stated that the pressure on the road is under 40 lb. per sq. in.—less than that imposed by the average 30 cwt. truck. The trailers are each carried on two four-wheeled bogies, and are automatically steered by the draw-gear so that they follow in the tracks of the tractor. Each of the eight wheels is independently sprung, and the normal speed of the unit is about 15 m.p.h.

It is claimed that the tests carried out indicate that by certain improvements the cost of the tractor can be reduced and its efficiency increased. Certain modifications have been proposed and tests are being very carefully watched with a view to producing a second vehicle on similar but improved lines, which will be driven by a heavy oil engine. It is thought that it might be possible to manufacture future units at a price of about £2,500.

The directing committee, in addition to experimenting with this type of vehicle, has also carried out a considerable amount of research work for the improvement of 30 cwt. trucks, which are to be used in considerable numbers throughout the Empire. A 30 cwt. truck, equipped with a special radiator and with improved tires, is now being tested in the Anglo-Egyptian Sudan.

Signs of Business Betterment

(Continued from page 162)

The importance attached to betterment of the credit situation is further emphasized by the approval by General Motors, Du Pont, and other large industrial concerns of the adoption of trade acceptances in their business dealings.

And while automotive leaders are fighting in the front ranks of the battle which the nation's executives are waging to push business back toward prosperity, a few timidly hopeful signs of a turn seem to be manifesting themselves. Stabilization has taken place, at least temporarily, in some commodity prices; a few have even shown increases. Greater stability has been evident in the bond market and far greater confidence in the safety of banking institutions is widespread. Having been wrong so many times in the last two years, along with other prophets, we hesitate to do any more guessing at all. It does look, however, as though bottom had been reached.